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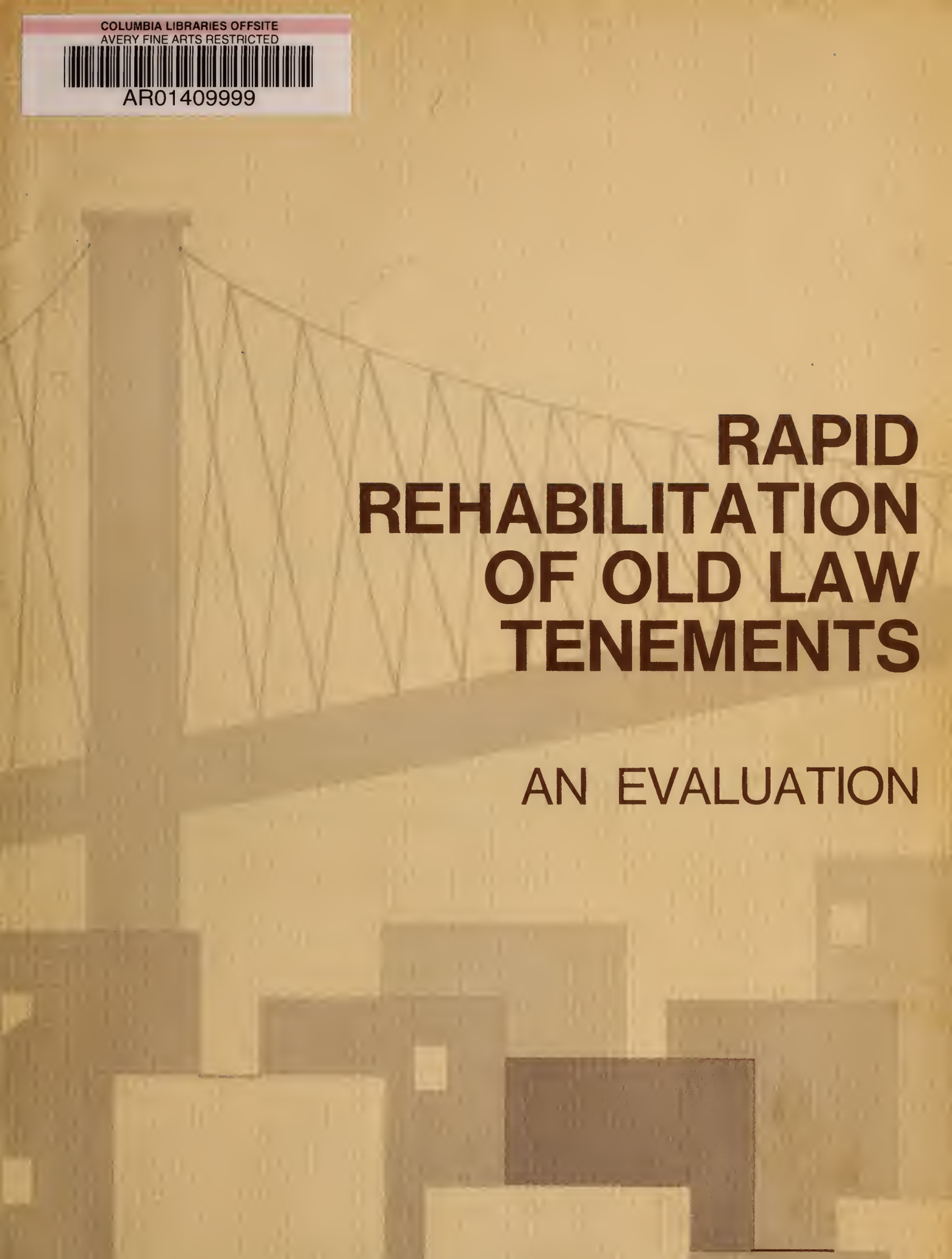

RAPID REHABILITATION OF OLD LAW TENEMENTS

AN EVALUATION

Institute of Public Administration
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RAPID REHABILITATION OF OLD-LAW TENEMENTS: AN EVALUATION

Prepared for
Robert C. Weaver, Secretary
U. S. Department of Housing and Urban Development
Office of Urban Technology
Low-Income Housing Demonstration Program

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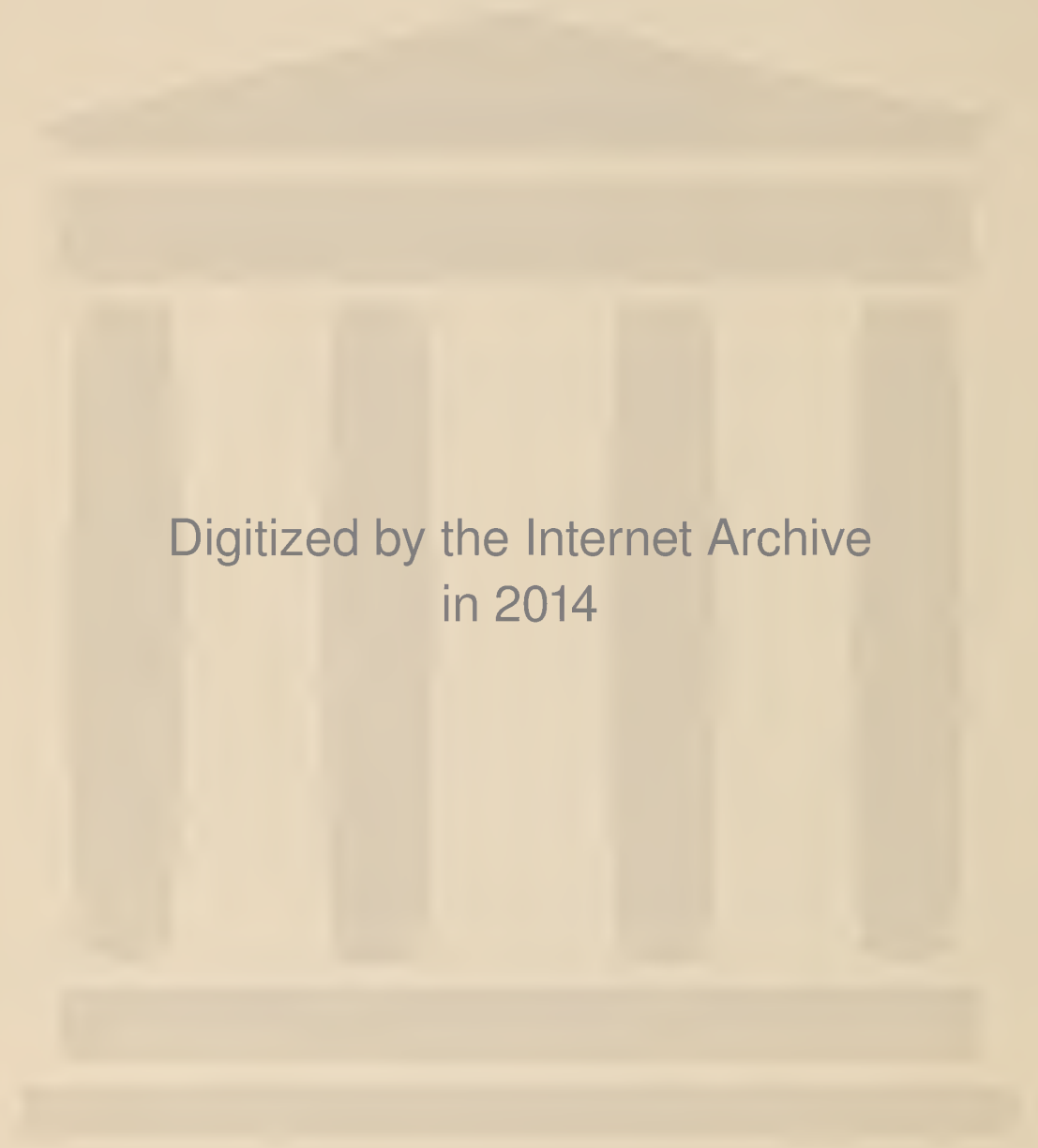
IPA thanks the many government officials who cooperated in administration of the demonstration grant and evaluation of the project.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CHARACTERISTICS OF THE CITY'S WORST HOUSING AND ITS TENANTS

RAPID REHABILITATION OF OLD-LAW TENEMENTS: AN EVALUATION

SUMMARY AND CONCLUSION

New York City is like most central cities: it has a large stock of deteriorating housing and its existing housing supply falls far short of meeting housing needs. But New York's deteriorating housing is unlike that of most other central cities in that it is virtually all rental housing. The social and financial aspects of any large-scale rehabilitation program, therefore, are peculiar to New York.

At least 300,000 units in about 50,000 structures are estimated to be deteriorating.[1] Many of these are in the 43,000 "old-law" tenements which were officially disapproved in 1901 as obsolete in design and inadequate as to standards of health and comfort. Their high capacity for survival, however, is evidenced by the fact that after many campaigns and crusades for replacement such a large number still remain.[2]

Housing studies conducted for the Community Renewal Program of the City Planning Department indicated that in the mid-1960's nearly half a million households were inappropriately housed, meaning that they were living in overcrowded quarters or paying rents disproportionately high relative to their income, or both.[3] The greatest deficiencies, the report concluded, were in units renting for less than $50 a month, and in units of four rooms and more for larger families.[4]

Despite various government programs aimed at cost-reduction, total costs of recent new public assisted housing have run between $17,000 and $21,000 per housing unit (depending largely on the size of the unit

---

1. Deteriorating: housing which requires repairs to items such as foundation, walls, roofs, floors, stairways or ceilings, if it is to continue to provide safe and adequate shelter.

2. The present report shows the location of structures that may be considered most likely candidates for replacement or for rehabilitation if any large-scale rehabilitation program should be launched.

3. See Community Renewal Program report, *An Analysis of Current City-Wide Housing Needs*, New York City Department of City Planning (December 1965), Table 11.

4. *Ibid.*, Table 9 p. 26. A "deficiency" is defined as the difference between (1) the number of rental units of a particular size and rental bracket and (2) the number of families whose size and income qualify them for units in that class.

and the cost of site acquisition). Nonsubsidized rents for such housing exceed the rent-paying capacity of most families now living in substandard structures.

Assumptions Underlying Demonstration Projects

The rapid rehabilitation demonstration project was undertaken to test the feasibility of providing housing in rehabilitated old-law tenements to low-income families in New York City through a speedy and economical rehabilitation system combining advanced engineering techniques and the use of preassembled components. The project was based on the following main assumptions:

1. The fact that so many old-law tenements have endured for more than six decades after they were outlawed in 1901 indicates that they will be around for decades to come;
2. The overall shortage of housing precludes any massive site clearance that would necessitate correspondingly large relocation of tenants;
3. Old-law tenements, if structurally sound, can be made reasonably livable for at least a few more years;
4. Rehabilitation (as opposed to new construction) would avoid the necessity for large-scale tenant relocation in the course of housing improvement. It also would enable by-passing some of the obstacles to new construction including zoning restrictions and building code requirements, and land assembly (it is no longer possible to build on lots as small as those used for old-law tenements).
5. With careful scheduling, off-site fabrication of core kitchen-bathroom units, and pre-packaging of building materials, construction time and costs might be cut drastically relative to the cost of either conventional rehabilitation or new housing;
6. If fast rehabilitation techniques could succeed in the old-law "dumbbell" tenements, they might be adapted to other types of structures.

Experience with Project

The project introduced a number of innovations, the most publicized being the fast installation of service cores—kitchen and bathroom units—preassembled off-site. Precut interior wall, floor and ceiling coverings, and prefabricated windows were used. Service cores were put into place by large construction cranes working through vertical portholes cut through the roof and floors.[1] Work was continuous, employing three shifts around the clock.

---

1. A plan for removing debris through these portholes had to be abandoned because of union complications.

The project ran into many unforeseen complications which in part frustrated its main purpose. Acquiring buildings, obtaining mortgage funds, and obtaining approval of plans consumed nearly a year. Some delays were caused by technical problems, others by administrative difficulties, for instance the insistence of local and federal inspectors on work methods and materials considered obsolete or unnecessary by the subcontractors. All necessitated changes and adjustments in original plans. A major delay was imposed by a plumbers' strike of unprecedented length (over six months) in Manhattan and the Bronx. This strike, occurring after supervisors, technicians, and a special work force had been assembled and partly trained, added to project costs.

Summary Evaluation

In our judgment, the very high costs emerging from this demonstration along with our review of comparative costs of conventional methods raise grave questions respecting *drastic* rehabilitation of *ordinary old-law tenements* as a significant aid to the solution of New York City's housing problems. (There is always the possibility, however, that the approach might have limited application where in a particular instance cost is not an important factor in relation to other objectives.)

The hope that the techniques and materials employed would reduce costs was not borne out by this demonstration. Usable square foot *construction* costs were in the neighborhood of $45 or two and one-half to three times the cost of conventional rehabilitation or new construction.[1] (See Chapter III.) Because both rooms and units in the rehabilitated structure are much smaller than in recent new low-income housing and housing rehabilitated by conventional methods, the relative differences in cost per unit and per room are less, but still substantial.

High costs might be reduced by extending the time of rehabilitation sufficiently to eliminate the necessity for overtime, and to get maximum productivity from workers and supervisors. Productivity might also be enhanced by repetition. No data have yet emerged, how-

1. Analysis by technicians of the U. S. Department of Housing and Urban Development arrived at a cost of $38 per usable square foot. The difference is mainly in the amount of expenditures charged to "demonstration" as opposed to actual construction, and a difference in the computation of average usable square feet per apartment: IPA's computation, verified by the subcontractor, is 495 square feet compared to the computation by HUD analysts of 520. HUD technicians estimate further that by eliminating overtime and by working with a large volume of structures, rehabilitation could be reduced to $20 per usable square foot. Even these figures, however, are above costs of new construction and conventional rehabilitation.

ever, to indicate that costs per usable square foot can be lowered enough to make them competitive with conventional rehabilitation or new construction.

The livability and attractiveness of the reconstructed buildings were improved but remain considerably below standards under which such buildings were outlawed 66 years ago. Deficiencies of light, air and convenience (particularly lack of elevators) were not overcome. Rooms and units are of minimal size. These are irremediable deficiencies. There are other deficiencies of design and technique which can be overcome with minor adjustments in the standards and methods employed in the rapid rehabilitation process.

Conventional rehabilitation of old-law tenements presents many of the same deficiencies. The costs per unit and per usable square foot of other projects we have examined are lower than the costs of the rapid rehabilitation process. However, from the limited data available, thorough rehabilitation by more conventional methods looks to be about as costly per square foot of usable space as new construction and does not avoid the problem of relocating tenants.

In the rapid rehabilitation project, tenants were out of the demonstration building less than 72 hours. Of the twenty tenants in the building at the time of acquisition, however, only three remained at the end of the program. Nine moved out voluntarily before rehabilitation was begun. Of the other eleven, eight were eventually placed in the two (formerly vacant) experimental buildings used in the demonstration. On the whole, tenants appear pleased with the new units—more so in respect to the three—rather than the one-bedroom units—though most have some specific complaints. However, the small number of tenants involved precludes any general conclusions about tenant reactions in any large-scale program.

The demonstration project was brilliantly successful in demonstrating that a systems approach using critical path scheduling and suitable materials can cut the time required for the main physical work of rehabilitating an old-law tenement (and thus by implication other types of residential structures) from an average of six months (experienced on other old-law tenement rehabilitation projects) to 48 hours.[1] Much of what was learned and developed in the fast rehabilitation project can be transferred to rehabilitation of other types of structures and to new construction. This includes knowledge gained by testing new products and materials, and by use of critical path

1. This does not include work on the exteriors of the buildings or work in basements and public corridors. The two-day period was used to gut and rebuild the interior of the building.

scheduling, preassembled kitchen and bathroom units, precut interior walls, floor and ceiling coverings, and prefabricated window units.

The most publicized innovation—fast installation of kitchen and bathroom units preassembled off-site—was successful in reducing construction time but proved to be very costly. Further technological improvements and mass production unhampered by present union restrictions are required to reduce the cost of such units.

Another benefit resulting from the demonstration was the establishment in New York City of a special city agency task force for experimental housing, charged with finding ways of facilitating compliance with building code regulations. (See Chapter V for a detailed review of the administrative difficulties encountered during this project.)

Last, but not least, the project has again pointed up the necessity for modernizing building codes, revising the labor practices of building trades unions and reducing official red tape if substantial results are to accrue from advances in construction technology. It is therefore urgent that public and private agencies, acting together, vigorously advance additional rehabilitation efforts within the city, such as the program under way for renovating brownstones in the Park Slope area of Brooklyn and the projected rehabilitation of new-law tenements on 107th Street.

Alternative to Large-Scale Rehabilitation of Old-Law Tenements

These results suggest that an approach more feasible than rapid rehabilitation, in areas where old-law tenements predominate, is the staged replacement of such structures with new buildings of moderate size. In most such areas, there are vacant tenements which may furnish sites for new "vest pocket" housing. According to the 1966 Annual Report of the Department of Buildings of the City of New York there are more than 1,800 vacant multiple-family structures in the city, and it appears that the number has been increasing. Many others, not completely vacant, have a low rate of occupancy. A program of staged new construction can be combined with rehabilitation of brownstone apartments and with certain types of new-law tenements which are more suitable for rehabilitation than are old-law tenements. While we have made no analysis of the general applicability of such a staged approach, we are convinced that it is essential to any dramatic improvement of New York City's slum housing.

Several cases in point: At the time the three old-law tenements were acquired for the present demonstration two were vacant and one occupied, and nine of the twenty resident households relocated them-

selves voluntarily before renovation had even begun. The space occupied by three buildings could have been freed by relocating only eleven families.

The rehabilitation program on 114th Street, comprising thirty-six old-law tenements, began work on three buildings in April 1965 of which two were already vacant and one was made vacant by relocating tenants in thirty-five to forty-five other units available on the block.

In the project for conventional rehabilitation of twelve new-law tenements on East 102nd and 103rd Streets in Manhattan (sponsored by the U. S. Gypsum Company) it was possible to relocate families to vacant units within the project area and to proceed with complete renovation of the vacated buildings.

Chapter I

Background and Organization of the Rapid Rehabilitation Demonstration Project

New York City's Housing Needs

Looming large in the picture of New York City's monstrous housing needs are the 43,000 "old-law" tenements, built prior to 1901 to standards that were superseded in that year by the provisions of the Tenement House Act. These structures contain about 335,600 dwelling units estimated to house over a million people.

There are nearly 50,000 "new-law" tenements built between 1901 and 1929, with approximately 811,000 units housing some 2.5 million people. While the new-law tenements were an improvement in many respects over the old-law tenements, many (particularly those built between 1901 and 1915) are still grossly deficient by present standards respecting size, light, ventilation and conveniences.[1]

Between 1960 and 1965, the number of old-law tenements declined by approximately 7½ percent and new-law tenements by 1 percent. At these rates, eradication of old-law tenements would require 65 years and of new-law tenements, five centuries. These tenements, then, are the sturdy backbone of New York's present slums.[2]

Slum-dwellers are vociferously unhappy about the quality of their housing: a 1966 survey of public opinion in Harlem showed that Harlem residents consider housing their number one problem.[3]

Given the remarkable survival capacity of the old-law tenements, which reflects in part the low purchasing power of New York City slum dwellers, there is a great temptation to accept the prospect that obso-

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1. Quite apart from these characteristics, the Census of 1960 rates 276,000 dwelling units of various types as "substandard," a category which includes (a) all units deficient as to plumbing and (b) units in dilapidated structures.

2. Care must be taken, of course, in applying to specific areas generalizations which reflect city-wide conditions. Many old- and new-law tenements were either built to higher than ordinary standards or have been substantially improved over the years. Any renewal project has to address itself to the special rather than the general situation.

3. John F. Kraft, Inc., *A Survey of Attitudes of Harlem Residents Toward Housing, Rehabilitation, and Urban Renewal* (August 1966).

lete tenements will endure for several decades (if not centuries) and try to make them more livable in the meantime. This entails rehabilitation. At the time of this demonstration six projects for rehabilitating old-law tenements (including the project here described) were under way, involving a total of nearly 800 dwelling units.

It appears that drastic rehabilitation (including gutting and rebuilding interiors) by conventional methods costs approximately as much, per usable square foot, as new housing. (See comparative cost data, Chapter III.) Under existing conditions and restrictions, however, certain characteristics of standing structures offer advantages for rehabilitation over new construction. The major advantage is that rehabilitation can be done without the trouble of assembling parcels of land sufficiently large to meet present standards of lot size. A second advantage is that various building code requirements do not apply to, or can be waived for, rehabilitation of old structures. Third, although the cost of drastic rehabilitation per usable square foot may equal or exceed the cost of new housing, the cost per room or per unit may still be less because the size of rooms and units in old- and new-law tenements is so far below existing standards. In short, whatever the cost, it is often less trouble to rehabilitate old structures than to build new housing. However, neither conventional rehabilitation nor new housing can come anywhere near to meeting the greatest need mentioned by the Community Renewal Program study:[1] units renting for $50 and under. And the standard rehabilitation design for old-law tenements, with a maximum of three bedrooms, cannot meet the very substantial need for units of five or more rooms.

Rehabilitation of old-law tenements by conventional means requires four to nine months (six months is cited as the average) and this raises the bugaboo of all urban renewal: tenant relocation. Large numbers of tenants can be relocated only with great difficulty and, frequently, much social upheaval. Very fast rehabilitation would obviate the relocation problem by making it possible to move tenants out of their homes for brief periods—two or three days—while rehabilitation work was being done. A technique to accomplish this objective was proposed in 1965 by the engineering firm of T. Y. Lin & Associates and its president, Edward K. Rice. If successful, the technique might be applied to other buildings, particularly new-law tenements, as well. It appeared also that fast rehabilitation, and the techniques for achieving it, might generate economies which would hold costs to or below costs of conventional rehabilitation.

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1. *Op. cit.*, Tables 9 and 11.

This concept and the proposed project were well suited for a federal demonstration grant under the provision of Section 207 of the Housing Act of 1961, as amended. The purpose of the demonstration, in brief, was to explore the feasibility and the cost of technique of rapid rehabilitation applied to an old-law tenement.

In the initial planning stage, 48 hours and a $5,000 construction cost per unit were set as targets. The time-target was achieved, the cost-target was far overshot (see Chapter III).

Participants in the Demonstration Project

The New York City Rent and Rehabilitation Administration has been the prime mover behind the old-law tenement rehabilitation projects now under way in New York City. The Institute of Public Administration (IPA), a nonprofit organization, agreed to serve as prime contractor for the purposes of obtaining a demonstration grant from the Federal Low-Income Housing Demonstration Program administered by the Department of Housing and Urban Development and of evaluating the demonstration.[1]

Under the terms of its agreement with the Federal government, IPA contracted with T. Y. Lin & Associates for the development and testing of the fast rehabilitation techniques and for the preparation of a technical manual covering techniques and procedures. The subcontract was subsequently assigned to CONRAD Engineers, a corporate entity headed by Edward K. Rice. As of September 11, 1967, a total of $1,364,759 had been authorized under the grant, of which $1,200,939 had been paid to CONRAD (the difference being retained by IPA to meet costs of administering the grant and evaluating the project). In addition, CONRAD had requested an additional allotment for overcosts of $105,305, which had not yet been approved by HUD.

The low-income housing demonstration grant covered the costs of research and development. A separate arrangement was made for acquisition and rehabilitation costs of three old-law tenement buildings, two to be used for experimentation and testing and one for the final demonstration, to be financed by a Federal Housing Administration 221(d)(3) below market-interest-rate loan of $568,400. The loan was made to a nonprofit sponsor, the Carolyndale Foundation, organized by Mrs. Carol W. Haussamen for the purpose of acquiring, rehabilitating

1. As of the date of the original agreement, September 1965, the Department had not yet been formally constituted; the grant to IPA was made by HUD's predecessor, the Housing and Home Finance Agency.

and later managing the demonstration structures. A construction firm (IMPCON), also headed by Edward Rice, was retained by the Carolyndale Foundation to do the construction work.

Various city agencies cooperated in the demonstration project. The New York City Rent and Rehabilitation Administration agreed to assist as coordinator of city agencies concerned (including code-enforcement agencies), in such matters as selection and acquisition of structures, provision and protection of storage bins for tenants' belongings, securing space to assemble and package components, blocking off curb-side street space when needed, assisting tenants, processing applications by the sponsor-owner for rent increases necessitated by rehabilitation costs, and arranging for rent supplements necessary to meet the rent increases. The City Planning Commission and the Housing and Redevelopment Board cooperated in processing sponsor-owner applications for tax exemption and abatement after rehabilitation was completed. Other cooperating agencies included the Departments of Buildings, Police, Fire, and Marine and Aviation.

Withal, the cooperation was accompanied by a great deal of red tape and delay, described in Chapter V, which increased the cost of the project.

The Demonstration – Procedures and Techniques

The decision was made to acquire three adjacent old-law tenement buildings for the demonstration project, two of which would be used for experimentation and for testing procedures and materials. The third, an occupied building, would be used in the final demonstration, and would be gutted and rebuilt on a 48-hour schedule.

Three factors were crucial in achieving the proposed speed of rehabilitation. The first was the use of special materials—materials for walls, ceilings and floors, fast-drying paints and varnishes, and prefabricated window frames. It was anticipated that manufacturers, lured by a large potential market in redevelopment, might develop new products to meet the special needs. The second was the widely-publicized installation of service cores—kitchen-bathroom units fabricated off-site and placed in the building, with the aid of a construction crane, through portholes cut in roofs and floors. The third factor was careful critical path scheduling, which would assure coordination and dovetailing of the manifold detailed tasks involved.

The three old-law tenements selected (after considerable searching) were located respectively at 637, 635, 633 East 5th Street. The first

two buildings were vacant and hence suitable for time-consuming experimentation; the third, selected for purposes of the final demonstration, was occupied.

The tenements were the standard "dumbbell," five-story walkups, 80 feet deep and 25 feet wide (see reproduction of plans in Appendix). The final procedures and installations included:

a. Virtual gutting of the demonstration test building by hand, leaving only outside walls and a few interior partitions, floor joists and partially usable subfloor.

b. New, preplaced foundations for vertical tiers of mechanical cores.

c. New walls of vinyl-covered sheetrock on furring strips.

d. New finish floors of wood chip particle boards impregnated with urea resin.

e. New ceilings of 2′ x 4′ x ½″ mineral boards dropped in a "T" frame suspended on wires from old joists.

f. New window units, with frames, jambs, heads, sills and aprons.

g. Two different mechanical cores, approximately cubical in shape, containing a 3-fixture bath, a 3-fixture kitchen, and wiring harness, lowered through roof ports onto the special foundations mentioned in (b) above.

h. New doors and trim throughout.

i. New wiring and convenience outlets throughout.

j. Renovating completely the existing heating plant.

Service cores would be fabricated off-site; vacant city piers would provide space for such an operation. It later developed that the Department of Marine and Aviation, which had jurisdiction over the piers, was constrained under existing city regulations to require substantial rentals for pier use. This was one of many hitches which developed as the project went along.

The project from the outset encountered numerous delays. Arrangements between the Institute of Public Administration and the Low-Income Housing Demonstration Program were concluded in September of 1965. More than six months were consumed in selecting buildings, arranging for the FHA financing under Section 221(d)(3), and obtaining necessary permits and clearances. Work on kitchen-bathroom assembly was interrupted by a plumbers' strike lasting some six months.

The occupied building had 20 tenant households at the time of purchase. Nine of these moved during the period of preparation, leaving only 11 to be relocated. On April 10, 1967, they were moved to the Broadway Central Hotel, where they were housed. (Five dollars per

person per day was allowed for food.) Because of the necessity of early moving, most tenants were out of the building for a period closer to 72 than 48 hours. After tenants departed, their furniture was removed and stored in moving vans parked on the street, to be replaced in the renovated apartments before their return.

The crash rehabilitation program began on April 11, 1967, continued around the clock for two days, and was completed for demonstration purposes in 47 hours and 52 minutes. The returning tenants were handed keys at a gala public ceremony on April 13.

Management

The Carolyndale Foundation, nonprofit owner sponsor of the three rehabilitated structures used in the demonstration, retained the real estate firm of Walter and Samuels to manage the property.

The managing firm's responsibilities include: (1) screening and selecting tenants; (2) billing and collecting rents; (3) providing for necessary repairs; (4) handling tenant requests and complaints; and (5) supervising building personnel. A management fee of 6 percent of the current rent roll is the maximum permitted by FHA for these services. Assuming full occupancy and present rent levels, the management fee for one building would range from $3,200 to $4,100 per year.[1] The higher figure is the maximum that would obtain if all tenants paid a 28 percent surcharge because of high incomes.

The 6 percent allowable rate is reported to be below the rate paid by private owners for management of similar property (10-15 percent of rents). Moreover, the allowable fees will not meet actual management costs because of employee time required to cope with problems in rehabilitated structures such as the following:

1. Frequent contacts with tenants to inform them concerning care of the apartments and use of facilities (i.e., caring for walls, floors, and appliances, use of the garbage chute rather than the windows for garbage disposal, not littering and marring hallways, etc.). Such contacts are complicated by language barriers.

2. Frequent turnover of custodial personnel and supervision of building superintendent to assure proper operation and maintenance of structures.

3. High susceptibility of structures to vandalism.

4. Personal collection of rents on days on which welfare checks are received.

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1. The lower figure, $3,200 per year, is based on a rent roll with no surcharges.

Because of the experimental nature of the project and the public attention it received, an unusually great amount of time has been devoted to managing the demonstration building.

Efforts are being made to overcome some of the difficulties. Management hopes that careful scrutiny of potential tenants may minimize maintenance and repair costs attributable to tenant carelessness. Also an attempt is being made to induce tenants to mail rents by money order (at management's expense) to reduce the cost of rent collection. In the first two months following completion, the buildings were not defaced or vandalized, and littering was minimal. However, guards were still on the premises.[1]

Tenant Selection

Since the completion of renovation, management has been preoccupied with tenant selection. Priority is being given to families residing on the block and in the neighborhood. The FHA regulations respecting the size of family and income level for self-supporting families apply; eligibility is limited by the fact that only one- and three-bedroom units are available in the renovated buildings.

One-bedroom units are restricted to one- and two-person households—either married couples or two persons of the same sex. Three-bedroom units are restricted to 4- to 6-person households. Families of three persons or two persons of the opposite sex, other than husband and wife, are automatically disqualified.

Rentals

Monthly rents in the rehabilitated structures are predicated primarily on the amounts of the mortgages (40-year term, 3 percent).[2] They range from $77 to $88 for the one-bedroom units to $115 to $121 for the three-bedroom units depending upon location. Self-supporting families, however, are eligible for these rentals only if incomes do not exceed $5,750 for one-person households; $6,590 for two-persons households; $8,200 for three- and four-person households; and $9,450 for five- and six-person households. Those with incomes exceeding these figures, either prior to or during occupancy, are subject to a 28

1. See subsection, "Reinspection of Demonstration Building in February 1968," for a later analysis of project conditions.

2. Rentals were set to produce sufficient income for annual interest and amortization costs and operating and maintenance expenses, together with some reserve for vacancy and collection losses and replacement, and management fees.

percent surcharge. (None of the three self-supporting households which moved back into the demonstration buildings had an income above the maximum.)

The objective is to achieve a balanced distribution of welfare-assisted, rent-supplement recipients and self-supporting tenants, but welfare applicants predominate. As of the early part of June 1967, 33 units were occupied: 14 by welfare-assisted, 7 by rent-supplement, and 12 by self-supporting families. As of February 1968, all units were occupied: 25 by welfare-assisted, 16 by rent-supplement, and 7 by self-supporting families.

Tenant leases are for one-year periods, which makes possible annual adjustments in rent to make up differences between estimated and actual costs of operation and maintenance. Since new materials and a new type of heating system are being utilized, actual operation and maintenance costs cannot yet be determined.

Chapter II

Standards, Quality, and Design

Standards

What should be the minimum standards for American housing in the twentieth century? There is no single answer: different public agencies set different standards. FHA, for example, has three sets of standards: two for new and a third for rehabilitation work. Standards of the Federal Housing Assistance Administration, the New York State Division of Housing, and the American Public Health Association are different. Every local community imposes a set of standards implicit in its zoning ordinances, building codes and health ordinances, which present a confusing array (see Table II-1). Most such standards exceed those of the completed rapid rehabilitation demonstration building.

In deciding whether renovation of old-law tenements is feasible and justifiable it is necessary to determine how far to compromise modern standards. If we are willing to accept the standards of the nineteenth century, when the old-law tenements were built, further discussion of standards is superfluous. But those standards were officially disapproved in 1901 (see Table II-2 for a comparison of standards in old- and new-law tenements). The decision on how far to compromise involves a large element of subjective judgment and public values. The main policy question for New York City and other cities today concerns the quality of housing which should be provided to the poor, many of whom require public assistance in some form.

Acceptance of old-law tenement standards implies a decision to retain them for several more decades. If structures are substantially renovated and new mechanical equipment is installed, and if long-term mortgages finance these operations, there is no foreseeable limit to their longevity; waiving of standards cannot be excused on the grounds that the structure is temporary.

For testing the quality of the rehabilitated old-law tenements, the following principles and standards are suggested, in order of priority.[1]

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1. Standards discussed apply only to the structures themselves and do not reflect opinions respecting outdoor space available to the occupants. Of course, in any extensive renewal or rehabilitation effort this matter must be addressed. (See section on "Neighborhood Renovation," p. 33.)

Table II-1

COMPARISON OF VARIOUS MINIMUM PROPERTY STANDARDS WITH RESULTS OF RAPID REHABILITATION DEMONSTRATION PROJECT

	FHA (300) 1 & 2 Family January 1965	FHA (2600) Multi-Family November 1964	Low-Cost Housing, HUD-PG-1 October 1966	FHA-950 Rehabilitation June 1966	Tenement House Act of 1901	I P A Analysis	R R D P Demonstration Building (As Built)
Facing Windows (Distance Apart)	Free standing structures. Side yard provisions controlled by local zoning ordinances.	20' x 4' per floor + 2' for each 15' length	10'	8'	6½'	10' or mechanical ventilation	2'10''
LR Area							
For 1 & 2 BR Units	160 ft.^{2}	160 ft.^{2}	140 ft.^{2}	140 ft.^{2}	120 ft.^{2}	125 ft.^{2}	– – –
For 3 & 3 + BR Units	170-180 ft.^{2}	170 ft.^{2}	150 ft.^{2}	150 ft.^{2}	– – –	– – –	– – –
Min. dimension	11'	12'	11''	10'	– – –	10'	– – –
LR-DA-K Combined	– – –	– – –	– – –	1 BR Unit 210 ft.^{2} 3 BR Unit 240 ft.^{2}	– – –	– – –	1 BR Unit 215 ft.^{2} 3 BR Unit 293 ft.^{2}
Area of 1st BR	120 ft.^{2}	120 ft.^{2}	110 ft.^{2}	100 ft.^{2}	– – –	100 ft.^{2}	106 ft.^{2}
Min. Dimension	– – –	9'4''	7'	8'	– – –	7'	8'4''
Areas of Other BR's	80 ft.^{2}	80 ft.^{2}	80 ft.^{2}	70 ft.^{2}	70 ft.^{2}	70 ft.^{2}	74 ft.^{2}
Min. Dimension	8'	8'	8'	7'	– – –	7'	7'
Direct Access to Bathrooms	Yes	Yes	Yes	Yes	Yes	No	Yes
3-Fixture Bath	Yes	Yes	Yes	Yes	No	Yes	Yes
3-Fixture Kitchen	Yes	Yes	Yes	Yes	– – –	Yes	Yes
Laundry	Yes	Yes	Yes	Yes	– – –	Yes	No

Table II – 1 (continued)

COMPARISON OF VARIOUS MINIMUM PROPERTY STANDARDS WITH RESULTS OF RAPID REHABILITATION DEMONSTRATION PROJECT

	FHA (300) 1 & 2 Family January 1965	FHA (2600) Multi-Family November 1964	Low-Cost Housing, HUD-PG-1 October 1966	FHA-950 Rehabilitation June 1966	Tenement House Act of 1901	I P A Analysis	R R D P Demonstration Building (As Built)
Ventilation[a]							
Habitable Rooms	– – –	Mech 10/hr. [b]	– – –	Natural		Mechanical	No experimen-
Kitchen	Mech 15/hr.	Mech 8/hr.	– – –	Natural		Mechanical	tation under-
Bath	Mech 8/hr.	Mech 8/hr.	– – –	Natural		Mechanical	taken
Storage							
Bedroom	3' linear	10 ft.^{2} + 6 ft.^{2} for extra BR	3' linear	12 ft.^{2} + 6 ft.^{2} for extra BR		3' linear prim. 2' linear sec.	2'9" linear
Coat Closet	3' linear	Required	None	– – –		2' linear	One closet
Linen	9-12 ft.^{2}	10 ft.^{2} – shelf	8 ft2-shelf	8 ft.^{2} – shelf		1' linear	One closet
General	200 ft.^{3} + 75 per BR	100–200 ft.^{3}	50 ft.^{3}	100 ft.^{3}		3' linear with min. 6 ft.^{2}	None

a. Figures refer to changes per hour.
b. Where natural through or cross ventilation is not provided.

Table II – 2

SUMMARY OF THE MOST IMPORTANT CHANGES EFFECTED IN NEW TENEMENT HOUSING BY THE TENEMENT HOUSE ACT OF 1901

Prior to 1901	After 1901
1. Dark and unventilated rooms – 10 out of 14.	1. All rooms provided with light and ventilation.
2. Public halls dark and narrow.	2. Public halls light and ventilated.
3. 75 percent of lot occupied.	3. 70 percent of lot occupied.
4. No limit to height of building on narrow streets.	4. Height limited to one and one-half times the width of street.
5. Yards of interior lots 10 feet deep.	5. Yards of interior lots (6-story buildings) 13 feet, and plus 1 foot for each additional story.
6. Yards of corner lots 5 feet.	6. Yards of corner lots 10 feet.
7. Air shafts 28 inches wide, with no means of ventilation at the bottom.	7. Courts 12 feet wide, with an intake or tunnel at the bottom, renewing the air constantly.
8. Air shafts in the center of building 28 inches wide.	8. Inner courts in the center of building 24 feet wide.
9. Windows of rooms opening within 28 inches of windows in adjoining house.	9. No windows within 6½ feet of another window; windows generally 12½ feet and often 25 feet apart.
10. Rooms with 60 square feet of floor area.	10. No room less than 70 square feet.
11. No requirement for size of living rooms.	11. One room of 120 square feet in each apartment.
12. Access to other rooms and water-closets only through bedrooms.	12. Sole access through bedrooms prohibited.
13. Waterclosets, used in common by two families, located in the public halls.	13. Private watercloset for each family within its own apartment.
14. Cellar rooms permitted with ceilings only 2 feet above ground.	14. Ceilings of cellar living rooms required to be 4½ feet above ground.
15. Cellar walls and floors not protected against dampness.	15. Cellar walls and floors required to be damp-proof.
16. Non-fireproof tenements 8 stories high permitted.	16. Non-fireproof tenements limited to 6 stories.
17. Fire escapes with vertical ladders permitted.	17. Substantial stairs required for fire escapes.
18. Fire escape balconies 30 inches wide permitted.	18. Fire escape balconies required to be 3 feet wide.
19. Fire escapes located in air shafts.	19. Fire escapes forbidden in air shafts.
20. Iron gratings in shafts permitted without ladders or stairs.	20. Iron gratings forbidden and stairs required.
21. Public halls narrow; stairways narrow and steep.	21. No public hall or stairway less than 3 feet wide, with greater width the larger the number of units; maximum rise of 8 inches for stairs.
22. Wooden stairs and non-fireproof halls permitted in 5-story buildings.	22. Stairs and halls required to be completely fireproof.
23. Public halls not shut off from non-fireproof parts of building.	23. Public halls required to be shut off from non-fireproof parts of building.
24. Wooden tenement houses for six families permitted outside of fire limits.	24. No wooden tenement house to be occupied by more than four families.

Source: First Report of the Tenement House Department of the City of New York, 1902–1903.

A bed should be accessible from both sides so that it can be made and the floor under it can be cleaned. Since space may be at a premium, the bed may be against a wall but, if so, it must have space to move.

Army cots and Navy hammocks are not suitable for permanent occupancy. Standard single beds, 3′6″ wide with a 6′3″ mattress, are minimal. Because of the increasing height of the population anything shorter than a 6′8″ mattress will soon be obsolete. Closets must be 2′0″ wide to store clothes on hangers—an ordinary coat being of that width. Similarly, passageways must be 2′0″ wide to allow for circulation.

As shown in the diagram, Figure 1, these considerations require a space of at least 6′ x 6′10″ for the bed; any space of lesser width *or* length will mean that the bed cannot easily be made or the floor beneath it cleaned.

The diagram also shows the effect of overlapping the aisle space between two single beds. This requires a room 9′6″ x 10′; suggested minima are therefore 10′ x 10′ for a "twin" bedroom.[1]

Double beds of 4′6″ width for two people are becoming obsolete; the next largest width is 5 feet. The weight of a double bed precludes its being moved easily by a woman for making or cleaning and it should therefore be freestanding. This demands a room width of 9′0″, only 6 inches less than the twin bedroom. The same minima are suggested.

The above analysis pertains to *beds* only, and allows no space for chairs, bureaus, or desks. The geometry of dormitory beds offers little hope for saving space. For three beds, two aisles are required and there is no saving over the combination of a twin room and a single room except for studs and plaster. For four beds, the geometry is the same as for two twin rooms.

In the diagram of the living-bedroom (Figure 1) it is shown that no less space is used when the beds are placed in a corner than when they are similarly placed in the twin bedroom. The greater dimensions of the living-bedroom area, however, do make possible more space for another piece of furniture, such as an easy chair, a desk and a chair, or a TV.

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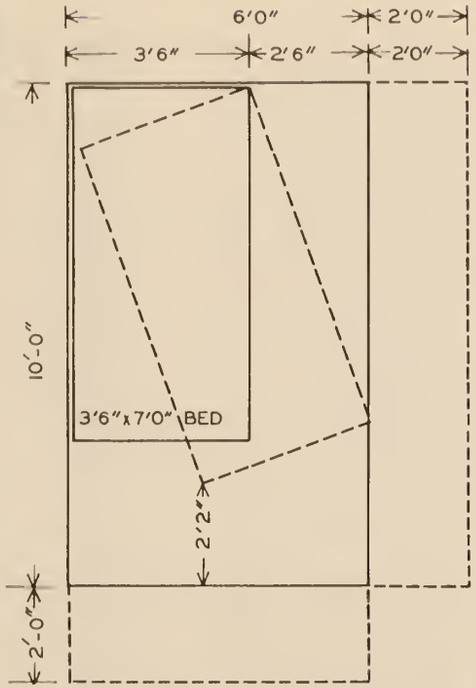
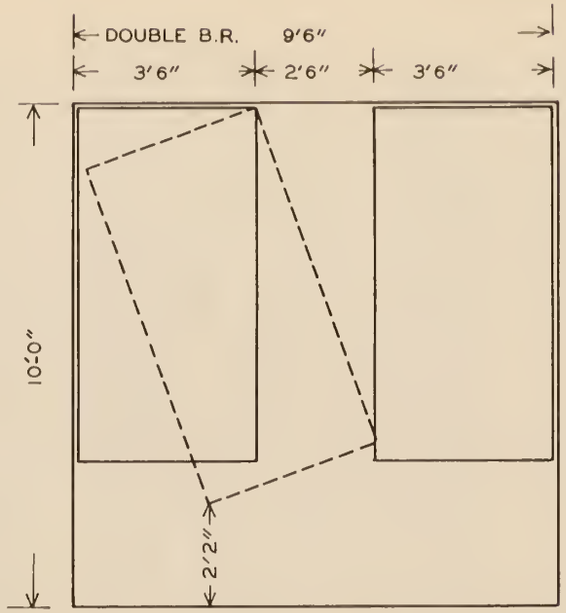
1. This agrees with the standard of 100 square feet for bedrooms in *Urban Renewal Rehabilitation*, FHA No. 950, rev. 6/66.

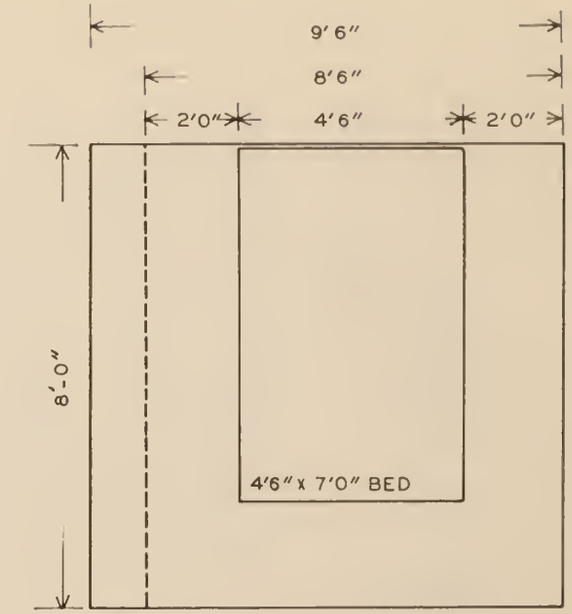
MINIMUM HOUSING COMPONENTS



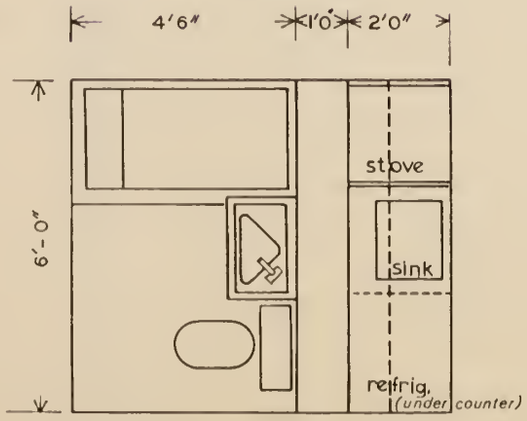
SINGLE BEDROOM UNIT
8'0" x 10'0" = 80¢



TWIN BEDROOM UNIT
9'6" x 10'0" = 95¢ SAY 100¢

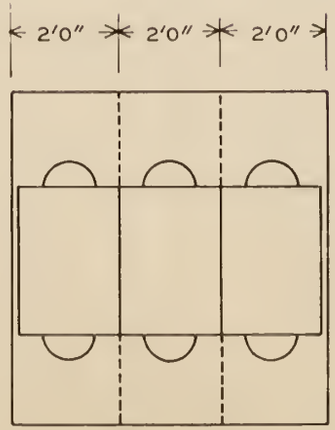


DOUBLE BEDROOM
9'6"X 9'0"= 85.5¢ SAY 90¢



BATHROOM KITCHEN

BATH-KITCHEN CORE - 6'0" x 7'-6" = 45¢

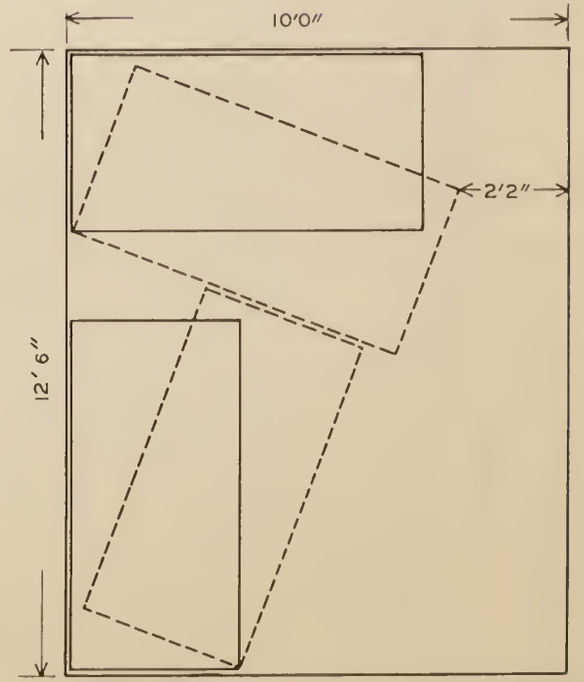


DINING

DINING - 6' x 6' = 36¢ SAY 40¢

CLOSETS:

PRIMARY B.R.	3	LIN. FT.	X	2	FT. DEEP	=	6
SECONDARY B.R.	2	=	=	2	=	=	4
COAT CLOS.	2	=	=	2	=	=	4
LINEN	1	=	=	1	=	=	1
GENERAL	5	=	=	2	=	=	10



LIVING - BEDROOM
10'0" x 12'6" = 125¢

Figure 1

Sanitary Facilities

A three-fixture bathroom, private for each family, is essential. All "standards" are unanimous on this point including the new Cornell study, "The Bathroom" (1967). While the usual 5′ x 7′ room is preferred, dimensions of 4′6″ x 6′0″, with the basin overlapping the tub, should not be rejected if space is tight.

Cooking and Eating

The three-fixture kitchen, like the three-fixture bathroom, is now unanimously accepted as minimum. With the three units—refrigerator, stove, and sink—counter space and shelves are needed. The advent of packaged, canned and frozen foods has to some extent reduced the need for large storage space and the capacity of undercounter refrigerators has been increased so that some space can be gained for work by using them.

A family should be able to sit down together to eat. The minimum module, again based on a 2-foot breadth for a human being, should be the depth of a card table: 2½ feet. With face-to-face seating, a booth 6 feet long is feasible.

The dining table, if placed immediately adjacent to the kitchen, can serve also as (a) a working surface for preparation of food (b) a homework desk for children, (c) space for letter-writing or card-playing, and so forth.

Laundry

Laundry facilities are required in either the living unit or the building. The requirement may be waived if economical laundromat service is readily accessible; otherwise, a public laundry in the basement area or at least a double sink with a deep compartment is essential.

Heating

A special committee of the Citizens' Housing and Planning Council of New York, created to evaluate the rapid rehabilitation demonstration project, has expressed particular concern about the long-term efficiency and serviceability of the gas heating unit which was used.[1] This type of doubt, however, can only be resolved after a considerable history of performance.

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1. *Report of CHPC Committee on "Instant Rehabilitation."* Citizens' Housing and Planning Council of New York, Inc., (July 1967).

General Living Space

It may seem unconventional to give the living room lowest priority in the housing kit, but it is essentially multi-purpose space to be used for eating, sleeping, recreation, study, and other purposes. Such flexibility argues that it should be as large as possible.

For instance, two persons may sleep in the living room.[1] The diagram (Figure 1) shows that with two beds in a corner and enough room for cleaning and bed-making, a "living-bedroom" can be as little as 10′ x 12′6″, or 125 square feet, and still allow space for some additional furniture. The non-bed space, 5′6″ x 9′0″, which must allow for bed-moving, is little enough for extra furniture or for activities other than sleeping, so that the size must be considered minimal.[2]

Storage

The comparative schedule of standards in Table II-1 shows the FHA new construction and rehabilitation standards, the PHA standards, and a summary of the conclusions drawn from this discussion. The suggested reductions in storage space in the IPA analysis are arbitrary and are based on the presumption that poorer people have fewer possessions. (This may not be true. It has been observed that some poor hang onto everything they can collect as a matter of security.) However, there is the possibiity of using unusual storage places, such as spaces under the bed, wall shelves, space on or over doors.

Ineradicable Defects of Old-Law Tenements

Obviously, windows of adjacent housing units *should* be far enough away from each other so that family life can go on without the immediate interference of the neighbors, and there *should* be separation of children by sexes in bedrooms, and there *should* be a way to the bathroom without invading another bedroom.

Old-law tenements do not and cannot meet these requirements, as correction of deficiencies would cost more than completely new construction, or at least far more than the value of potential benefits.[3] It is clear, for example, that the FHA standards for relation of windows between units cannot be met at all.

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1. The exact familial relationships, ages and sex are not enumerated, since no mandate can be imposed in any event on the families occupying the dwelling units.
2. This again substantially corroborates the standard for Urban Renewal rehabilitation, which requires a living room of 140 square feet.
3. This is true whether the structures are "instantly" rehabiliated as was the structure on 5th Street or are rehabilitated in the conventional manner, as is occurring in the 114th Street program.

Other impairments of standards, which were accepted for the demonstration project, and will undoubtedly be necessary in any future renovation, include:

a. Lack of privacy and acoustical control between units (necessitated by narrow interior courts and location of windows on such courts);

b. Inefficient room arrangements, e.g., in such matters as having to go through one habitable room from another to get to the bathroom or front door;

c. Kitchens opening into living rooms and bathrooms opening into kitchens;

d. Lack of elevators: in five-story structures a particular hardship for the infirm, the aged, women during pregnancy, and small children;

e. Lack of natural light: obviously unavoidable at the bottom of a six-foot light well five stories deep.

Evaluation of Rehabilitated Building

Three types of weakness are present in the rehabilitated building:

1. Defects in architectural layout resulting in lack of convenience and too few bed spaces — these can be corrected at little or no expense;

2. Lack of acceptable ventilation essential to long-term qualitative stability, the cost of which should be added to present indicated costs for comparative purposes; and

3. Defects such as lack of elevators, lack of natural light, and narrow dangerous stairways built into the basic structure so that they cannot be remedied.

One-Bedroom Unit

The one-bedroom apartment fails to take advantage of storage opportunities in spaces other than the bedroom. The congestion of bedroom space resulting from closet placement makes it extremely awkward to make the beds and to clean. It is doubtful whether the room can be considered a two-bed facility; however, it can be adapted for two beds with little or no added cost.

Living rooms in basement apartments (in the two experimental buildings) similarly violate space standards.

Three-Bedroom Unit

The three-bedroom unit is open to greater criticism. Two of the three bedrooms are so small and so awkwardly laid out that they can accommodate only one single bed instead of two, so that the maximum number of beds is four. This can be corrected at little added cost, as diagrammed in Figure 2, page 25.

Kitchens

No kitchen counter space is provided in the one-bedroom units, and it is inadequate in the threes. In place of the full-size stand-up refrigerator, an undercounter refrigerator with work space above would have been preferable.

No kitchen ventilation is provided on the theory that windows are present. These windows, on five-story shafts, were considered inadequate in 1901, and we can expect that the new apartments will be afflicted by the same odors and grease that afflicted the old.

Kitchen storage is inadequate; it could be improved by larger cabinets.

Rough plumbing should have been provided for a washing machine to make home laundry feasible.

Corrections other than ventilation can be made with little added cost.

Bathroom Details

The medicine cabinet is too small and too high for use by any but tall family members. Inadequate storage is provided.

The absence of a built-in shower curtain rod above the bathtub invites tenant installation and consequent mutilation.

The wash basin is too small to hold toilet articles being used, and has useless legs which only clutter up the floor and make cleaning harder.

The wall surface is susceptible to cracks and is of dubious durability. Corrections can be made at little cost.

Storage

General storage has been ignored, and opportunities overlooked. The closets in the halls of the one-bedroom units could have been made larger and wall closets been provided across the ends of the living room adjacent to the stair halls. The tiny closets in the halls of

Figure 2

the one-bedroom and in living rooms of the three-bedroom units are nearly useless. Added cost would lie in the range of a few hundred dollars.

Ventilation

The problem of ventilation was not explored in detail in the IPA evaluation for lack of funds. But ventilation was a prime reason for outlawing the building in 1901.[1] In 1902 Jacob Riis made the following statement about ventilation in the old-law tenements, and there has been no basic change in the system since that time: "A more unlovely existence than that in one of these tenements it would be hard to imagine . . . The air shaft is too busy carrying up smells from below to bring any air down, even if it were not hung full of washing in every story, as it ordinarily is."[2]

The five- or six-story light shaft, between five and six feet wide, has no opening at the bottom and precludes even the stack action of a chimney. Failure to correct adequately this shortcoming, particularly in light of available technology, is a serious flaw. In the demonstration building three exhaust fans were placed at the top of the respective tiers of cores. Two are said to exhaust 440 cubic feet per minute in each of the one-bedroom tiers at the front; the third exhausts 900 cubic feet per minute in the three-bedroom tier.

If these are totaled and divided by the volume of the building, about 1½ air changes per hour are indicated as against 10 changes per hour required by FHA standards.

Various benefits of ventilation should be noted for setting standards and measuring performance in the demonstration:

a. Provision of clean air, reducing communication of diseases between housing units.

b. Reducing transfer of odors from one unit to another, and from garbage spaces to living units. Bathroom odors should be exhausted to the outside.

c. Housekeeping cleanliness—kitchen grease and other volatile cooking matter not carried outside will be deposited on interior walls.

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1. IPA conferred with leading mechanical engineers in New York on this subject and learned that the limited study necessary to determine the most feasible adequate method of ventilation and to estimate its cost per unit would have involved an expenditure of a very few thousand dollars. It is recommended that this investigation be made prior to any continuation of a rehabilitation program for old-law tenements. Lacking this study, our architectural consultant guesses that between $200 and $400 should be added to the indicated construction cost of each apartment.

2. Jacob A. Riis, *The Battle With the Slum* (The Macmillan Company, 1902), p. 93.

These matters are not adequately covered by the vent requirements of the New York codes, which are microscopic compared to FHA requirements of eight mechanical changes per hour in kitchens and bathrooms, and ten changes per hour for other living spaces where neither cross nor through ventilation is supplied.

Waiver of Standards

The following 17 requirements of the "Minimum Property Standards for Rehabilitation" (FHA 950, June 6, 1966) were waived by the FHA for this specific project.[1]

1.	Room sizes	R 401-3
2.	Storage	R 401-10
3.	Laundry facilities	R 401-8
4.	Existing unused dumbwaiter shaft	R 407-1
5.	Stairs	R 404-2
6.	Width of apartment entrance doors	R 403-3.2e
7.	Kitchen storage	R 401-6.2
8.	Entrance closet in 1st floor front	R 401-9.1
9.	Requirement of flashing at windows	R 805
10.	Window screens	R 806
11.	Prohibition of wooden kitchen floors	R 808-2
12.	Fire alarm system	R 504
13.	Combustible stairs	R 501-4
14.	Width of main entrance doors	R 403-2.1
15.	Width of public halls	R 405-3
16.	Width of rear basement doors	
17.	Requirement of second exits from front basement apartments.	

Not noted as waived requirements were the serious matters of (a) elevators being required above the third floor (R 406-2, M 410-3), (b) ventilation as discussed elsewhere, and (c) light.

Capacity of Rehabilitated Units Versus Housing Requirements

The average size of all nonwhite families (including single persons) in New York is 3.14 persons. The average number of beds (or bed places if double beds are used) which can be accommodated in the units of the demonstration building is 2.67 (2 beds in the one-bedroom units and 4 beds in the three-bedroom units). An alternative layout, shown in Figure 2, would provide two additional beds in the three-bed-

1. From records of FHA inspector on the job.

room units, bringing the average number of beds per unit to 3.3. (This does not allow for the possibility of putting beds in the living rooms.) By comparison, the average number of beds per unit in 11 recent projects of the New York City Housing Authority is 4.19. (All bedrooms exceed the 100 square feet suggested here as the minimum.)

These data emphasized that rehabilitated old-law tenements using the experimental layout would serve only a portion of the families in need of housing. Specifically they would not meet the needs of those requiring (a) two bedrooms and (b) four or more bedrooms.

Reinspection of Demonstration Building in February 1968

The demonstration building was reinspected and two of the apartments were examined in February of 1968, approximately ten months after rehabilitation.

1. There were various gouges in the plasterboard walls (particularly on the first floor). It will be necessary to replace the walls in a few years.
2. The small bedrooms in both apartments are so tight that access to both sides of the beds is impossible. The beds were accordingly left unmade.
3. The general area of the kitchen unit, particularly in the one-bedroom apartment in which there is no forced ventilation, was greasy and discolored as a result of inadequate ventilation. Even in the case of the three-bedroom unit, where the vent has a fan at the top of the stack, the inlet register is so far from the cooking surface that grease deposits and stains were evident over a large area.
4. In one apartment, staining of the ceiling and wall was evident from water leakage, either in the space between the hung ceilings and the floor above or from a radiator in the floor above. One tenant complained about leakage somewhere in the plumbing core.
5. The floors are rapidly disintegrating. The particle board with the vinyl resin-impregnated surface has not stood up. In several places the surface is already scuffed through to the wood fibers, and the floor itself will probably have to be replaced before long. In the three-bedroom apartment the tenant had, at his own expense, covered the living room area with thin linoleum.
6. Public halls had been poorly maintained and had already begun to deteriorate. Floors and stairs were unclean; there was considerable spillage around the incinerator doors, one of which was stuck open; and the doors themselves were dirty.
7. In one of the two apartments, the intercom system to the front door no longer operated.
8. One tenant wished that a bolt or chain had been supplied on the door because of the lack of security. This tenant also kept all of the blinds pulled on the windows which faced on the air shaft to prevent his neighbors from peering into his apartment.

Several of the conditions found, such as poor maintenance and poor flooring materials, are of course not integral aspects of the demonstration project and therefore need not be repeated in other projects. However, it was clearly evident that this type of building can be retained in anything approximating satisfactory condition only by means of a vigorous, continuous maintenance program.

Difficulties with Building Code Specifications[1]

Plumbing

Major engineering and placement problems were created by the use of cast iron soil and vent pipes with hub-spigot connections.

> The hub-spigot cast iron connection is one of the more rigid methods and hence required extremely close measurements of floor-to-floor elevations. This, in turn, necessitated custom-built (as opposed to mass-produced) service cores, for since the height of each floor was (or could be) different from the others it meant that one and only one core could be anchored to only one particular core or platform . . .[2]

Installation of the cast iron pipe with hub-spigot connections is difficult and time-consuming even when no obstructions occur. In emplacement of the core where there is limited access, this type of connection becomes even more difficult. Though the contractor requested estimates of cost on other types of materials and installations, the restrictions of the building code severely limited the materials which could be used, as well as methods of assembly. Exploration of alternatives aroused the interest of only one manufacturer, who designed a single slip fitting: this proved to be contrary to the building code and could not be used.

Another shortcoming associated with the use of cast iron was the weight it contributed to the service core.

> . . . the heavier the service core the more difficult is it to maneuver and position. It is, therefore, preferable that the components of the service core be as light in weight as possible.[3]

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1. The materials and techniques used are described in a separate publication prepared by the subcontractor (Technical Manual). Reference to other materials and techniques tested but not used are included in the appendices which form Volume 2 of that document.
2. From the Technical Manual.
3. *Ibid.*

Service Core

Lowering the prefabricated service core through the roof was a major disappointment. It was heavy, required special handling and trucking during its course from pier to site, and was extremely costly to fabricate, transport and place. The necessity for adhering to the New York City code and labor practices precluded any technological innovations in the unit itself. This was no fault of the construction contractor.

A steel sandwich structural wall was tried but abandoned in favor of a framed cube of 4″ x 4″ x ¼″ steel angles. Within this cube, everything that was done was entirely conventional. Indeed, as noted under "Plumbing," the problem of connections was so exaggerated by the code that each core unit had to be custom-made.

Possible Improvements

Assuming the decision were made to proceed with more rehabilitation of old-law tenements, the following types of improvement in design and layout should be considered. These are in addition to the improvements implicit in the detailed criticisms listed above.

Increasing Bed Space in Three-Bedroom Units

An alternative design for six beds is demonstrated in the diagram (Figure 2). The shaded areas of the two plans show the space lost to circulation under the alternative designs.

An argument that the living room has to have exposure to the backyard, and that the plan-as-built is justified on this score, fails in our judgment because:

a. Privacy between bedrooms of different living units is more important than privacy between living rooms. It is therefore less desirable to put two out of three bedrooms on the side court (or "well") than two out of three on the backyard. In the plan-as-built, two bedroom windows of different units face each other directly at a distance of 5′4″ and the other pair, though at a slight angle, have centers only 2′10″ apart.

b. Living room windows should also be farther apart than the narrow well allows. But such proximity (which has been accepted in the one-bedroom units comprising two of the three units on each floor) is socially more acceptable than the juxtaposition of bedrooms of different families, on grounds not only of visual privacy but also of noise.

c. The amenity of backyard exposure is not lost to the living unit as a whole by putting bedrooms instead of living rooms on the backyard, since the number of windows is not changed.

Suggested Methods of Providing Improved Ventilation

The stair hall could be used as a plenum chamber under positive pressure. Air entrance to individual apartments could be through transoms over main entrance doors, equipped with fire linkage for emergency closing.

Cooking and bathroom odors should be exhausted into air wells through vents in bathrooms and through hoods located directly over cooking ranges. The minimum needed should be carefully calculated and not subject to tenant adjustment, and should be provided twelve months of the year.

Air circulation should be sufficient to ameliorate summer discomfort. If the FHA standard of ten changes per hour in the entire building is not feasible for some reason, compromises should be justified. (Exhaust could be controlled individually by opening and closing windows.)

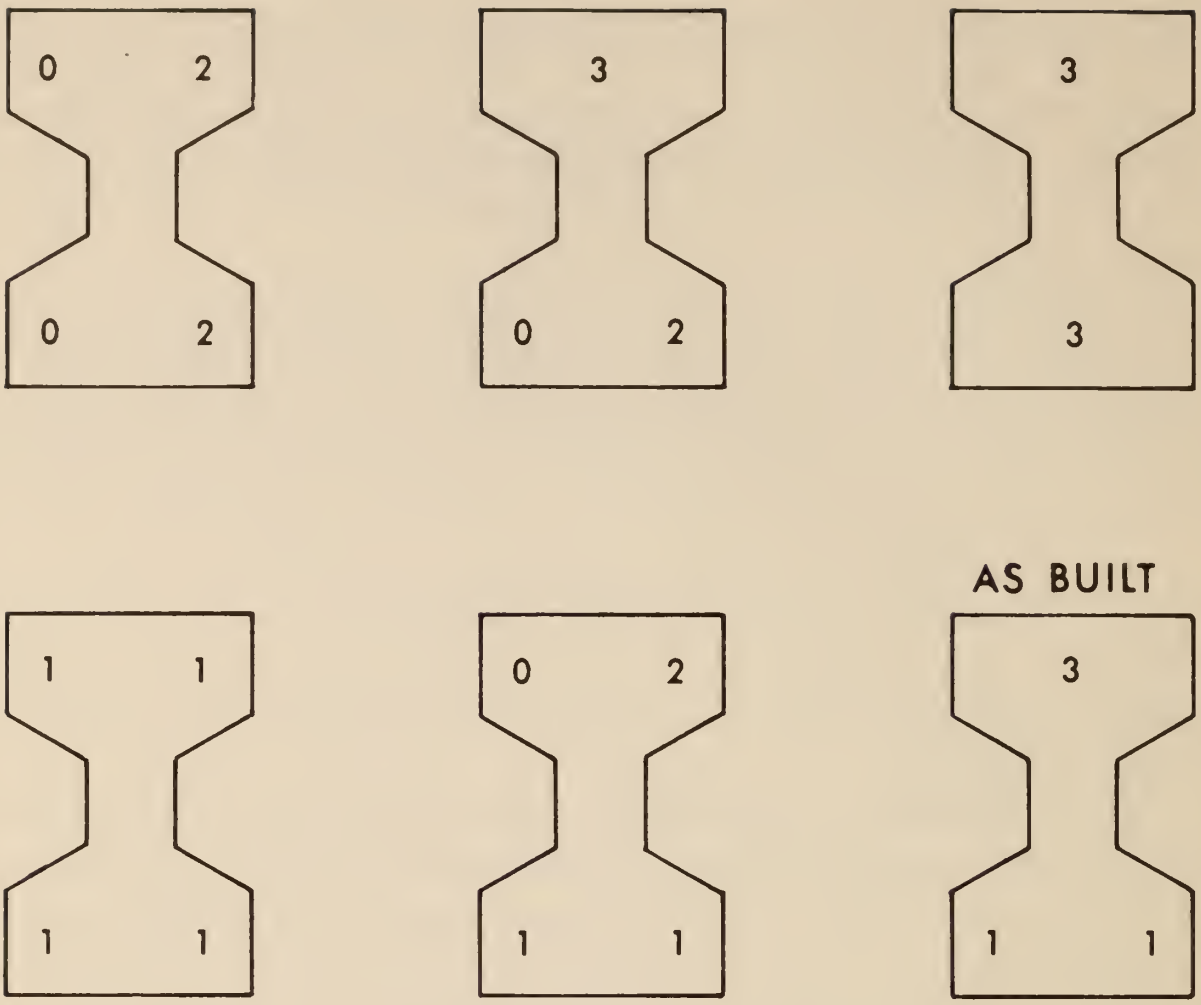
The supplying unit, probably a centrifugal type to provide positive pressure quietly, should be located on the roof away from the dirt of street and yard. Adequate filters should be provided, and heat for tempering the air in winter.

Such a system has several advantages. Clean filtered air would be supplied throughout. There would be no communication of bacteria from one unit to another, and no odors in the hallways. Bathrooms would be positively vented, and kitchen grease pushed out of the unit. Costs of decorating would be reduced, and housecleaning facilitated.

A second alternative would be to cover the well at the top and install a single exhaust fan, the well being useless for lighting. Air would be drawn into the units through front and rear windows. This alternative, though not as effective as the positive pressure alternative, would provide unfiltered ventilation of all apartment areas.

Greater Variety in Types of Apartments

The characteristic of the old-law tenement structure is that on one floor it can provide six combinations of apartment sizes, by bedrooms, as follows. (Numbers refer to number of bedrooms; zeros denote efficiency units.) As depicted, the fronts are at the bottom and the rears at the top.



The vertical port and core technique makes it impossible to change floor layouts from floor to floor in a single building, so that a diversified pattern in a single building is not possible to meet the full array of family sizes. With some ingenuity, however, it would be possible to satisfy a requisite distribution of family sizes in a group of buildings.

No plan was developed with a different distribution of units. An efficiency (0-BR), a two-bedroom, and a three-bedroom apartment on each floor would accommodate 11 beds on a floor instead of the eight possible in the structure as built. The efficiency would take care of most one- and two-person households; the two-bedroom unit, three- and four-person families; and the three-bedroom unit, five or six persons. The low efficiency (63 percent of potential) of the plan actually constructed may be regrettable but is not damaging to conclusions which may be drawn from the experiment since different layouts would cost little or no more.

The quality of housing produced in the demonstration cannot be assessed apart from the total quality of the surrounding environment. Here we mention only matters pertaining to physical environment.

One of the great deficiencies of blocks tightly packed with tenement buildings is lack of open space for light and air, visual appearance, recreation, and other purposes. Neighborhoods, not merely structures, need renovation. Potentialities for improvement in this respect are to be seen in a successful neighborhood project of the 1930's, *First Houses,* located not far from the East 5th Street rapid rehabilitation demonstration project. These structures are three- and four-story walk-ups with stores on some of the street floors. Today, after continuous occupancy by low-income families for over 35 years, *First Houses* is still outstanding in certain aspects of design and environmental quality.

The project began some 35 years ago when Vincent Astor turned over half a square block of dilapidated tenements to the newly formed City Housing Authority. In coping with the problem, some basic concepts for old-law tenement rehabilitation were formulated which, in the light of experience, were eminently successful. To gain light, air and open space every third building was demolished. Back yards were used for building semi-enclosed sitting areas with trees and small playgrounds.[1] To increase sidewalk capacity and reduce street crowding, side entrances to buildings were introduced in place of street entrances. Side entrances also provide greater privacy and better access to rear sitting and play areas.

While it may not be possible to replicate *First Houses* in large volume, its more important positive features should be incorporated wherever possible. This implies:

1. enough area and structures—perhaps a minimum of half a block—for thorough neighborhood renovation;

2. design of exterior amenities as well as interiors—removal of encroachments on sidewalks, accessibility of windows to light and open air (not two-foot shafts) and the use of rear yards for outdoor rest or play;

3. removal of 5th and 6th stories in walk-up buildings and the demolition of a sufficient number of buildings to remove or ameliorate the inherent deficiencies of old-law tenements, particularly the lack of light, air and open space.

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1. Another concept which has current relevance was that unemployed workers should be put to work on the renovation.

4. use of basements and first floor apartments for stores or public service space such as meeting rooms, schools, recreation space, and the like.

The renovation of areas in which brownstones predominate lends itself peculiarly well to this general approach, as is being demonstrated by the privately sponsored rehabilitation program underway in the Park Slope renewal area of Brooklyn. Inspection of the site in February 1968 showed that progress was far enough advanced to permit some judgments regarding the quality of the program.

All bedrooms had space for beds and adequate housekeeping. Ample closet space was provided and general storage space was available in the basement. Ventilating outlets in the kitchens, while still probably inadequate because of the New York City Code, were properly located immediately above the range burners and permitted easy installation of a hood to capture and channel fumes. Rooms were large enough to accommodate beds and other essential furniture.

In a single building it is possible to provide for two efficiency apartments on the top floor, two three-bedroom units on the intervening floors, and one two-bedroom unit on the ground floor.

As the buildings are only four stories high, and are 45 feet deep on a 100-foot lot, considerable open space is available. Backyards are planned as a community landscaped area, and planting boxes have been included in the shallow frontyards. All of the front stoops have been removed and the entrances are at the lower level (formerly under the stoop). Comparison of this spatial arrangement with that of the as-yet-untouched buildings on the same street indicates great improvement: openness has replaced clutter.

Although final cost data are not available at this time, estimates for construction are approximately $12,600 per unit with a total cost per unit estimated at $18,400.

Chapter III

Costs

Cost data are perhaps the most eagerly sought-after facts about rehabilitation, and the most difficult to determine. Does it cost less, and how much less, than new construction? Does fast rehabilitation cost more or less, and how much less, than conventional rehabilitation? Can costs be much reduced by technological improvements, lessening restrictive labor practices, modernizing building codes?

By our computations, the actual *construction costs* attributable to the demonstration building per se, omitting such extraordinary costs as experimentation and testing, come to $334,000 or $22,300 per unit for 15 units, and approximately $45 per usable square foot.[1] By comparison, construction costs of a conventional rehabilitation project undertaken during approximately the same period were $14.37 per usable square foot. Construction costs of a new, 38-unit, nonfireproof apartment house equipped with elevator service were $17.59 per usable square foot.

In comparison with the per unit cost of $22,300—construction, $26,400—total, the amount of the FHA mortgage is $11,600 per unit. Apparently, allocable costs incurred far exceeded (1) expectations, (2) amounts considered reasonable for mortgage purposes, and (3) per square foot construction costs of new housing.

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1. As noted in the chapter on summary and conclusions, after an extensive analysis of the cost records, HUD technicians have arrived at a somewhat lower cost of approximately $38 per usable square foot. IPA's accountant-consultant made estimates and allocations from CONRAD expense records. Costs allocated to the demonstration building included the following:
   a. Costs of labor employed during the 48-hour demonstration.
   b. One-third of the costs of roofs, exteriors, and basements after deducting costs of (1) repeated inspection of roof openings, (2) load-testing in basements to determine settling in the subsurface swamp, and (3) costs of four basement apartments in the two experimental buildings (635 and 637 East 5th Street).
   c. One-third of the cost of assembling and transporting utility cores after deducting an allowance for experimentation and delays from strikes and other extraordinary causes.
   d. A percentage of the above costs for architect's fee, builder's overhead, and builder's profit.
   e. Calculations of net usable square feet were made by CONRAD from "as-built" floor plans prepared July 1, 1967.

Table III-1

BREAKDOWN OF CONSTRUCTION COSTS – DEMONSTRATION BUILDING

		Total	Per Unit
Labor Employed During 48-Hour Period		$140,815[a]	$ 9,388
Cores			
Construction	$44,756		
Delivery	2,232		
Patching and Adjustments	3,290		
Emplacement	3,337		
Allocation of Pier Costs	7,227	60,842	4,056
Other[b]		132,649	8,843
Total		$334,306	$22,287

a. Includes subcontractors' overhead and a small amount of building material.
b. Includes cost of materials, preliminary and cleanup work, and miscellaneous. See Supplementary Schedule of "Other" Costs, p. 37.

Table III-1A

SUPPLEMENTARY SCHEDULE OF "OTHER" CONSTRUCTION COSTS

Other Costs		Amount
Concrete		$ 1,381
Masonry		1,413
Creating Materials at Pier		3,830
Finish Wood Floors		4,541
Millwork and Finish Carpentry		2,788
Windows and Frames		5,498
Doors and Frames		3,589
Miscellaneous Iron and Steel		4,303
Drywall – Ceiling and Panels		2,592
Roofing and Insulation		2,355
Painting		2,982
Tile		306
Plumbing		4,611
Boiler Repairs		5,479
Electrical		8,257
Crane		1,117
Trash Chutes		4,540
Carpentry Materials		10,955
Miscellaneous Hardware, Equipment Rental, Supplies, Etc.		8,832
Shoring Rental		574
Demolition		3,521
Cleanup		1,135
Pier Costs (Rent, Telephone, Watchmen, Fork Lift, Fuel, Insurance)	$14,454	
Less: Allocated to Cores	7,227	7,227
Halls, Stairs and Entrance Area		4,491
Intercom System		421
Loading Materials on Scaffold		12,433
Punch List		4,762
Cornice – Labor and Materials		1,023
IMPCON Labor, Payroll Taxes, Etc. (Not Classified Elsewhere)		5,842
General Costs (Insurance, Telephone, Accounting, Watchmen, Etc.)		11,851
Total		$132,649

To these figures must be added nonconstruction costs, including costs of acquisition, tenant maintenance during construction, carrying charges, fees and administration. The total nonconstruction cost is computed at $61,350, or approximately $4,100 per unit.

Table III-2

COSTS ALLOCABLE TO DEMONSTRATION BUILDING [a]

(Figures Rounded)

	Total	Per Unit	Per Usable Square Foot
Construction Costs	$334,300	$22,300	$45.00
Nonconstruction Costs	61,350	4,100	8.30
Total	$395,650	$26,400	$53.30

a. The amount of the mortgage, covering three buildings, is $568,400. We may allocate to the demonstration building $193,500 of the mortgage funds (one-third of the mortgage plus an allowance for the fact that the acquisition cost of the demonstration building was $6,000 higher than the average of the other two). Subtracting this amount from the cost of acquiring and rehabilitating the demonstration building ($395,650) leaves $202,150 as the portion of the cost which in effect was paid for from the low-income housing demonstration grant. The rest of the grant represents the cost of experimentation and testing, and rehabilitating the two experimental buildings.

In comparison with the total cost of $53.30 per usable square foot, costs of recently completed publicly assisted housing units in the city have been running between $16 and $22 per usable square foot.[1]

1. "Usable square feet" refers to space *within* apartment interiors only, excluding space in corridors, stairwells, incinerators, and elevators. It supplements such other measures of living space as "dwelling unit" and "room". Construction cost per square foot of usable space is affected by the number of units in that, the smaller the number of square feet per unit, the larger per square foot is the cost of plumbing and kitchen-bathroom fixtures. The figures shown in Tables III-4, III-5, and III-6 include both total cost per unit per square foot and "adjusted" costs, which exclude estimated cost of kitchen and bathroom fixtures.

Table III-3

CONSTRUCTION COSTS AND TOTAL COSTS PER UNIT AND PER USABLE SQUARE FOOT RAPID REHAB DEMONSTRATION PROJECT AND OTHER RECENTLY BUILT NEW AND REHABILITATED HOUSING

	Total Costs		Construction Costs	
	Per Unit	Per Usable Square Ft.	Per Unit	Per Usable Square Ft.
RRDP (East 5th St.) Project	$26,400	$53.30	$22,300	$45.00
Conventional Rehab Project (See Table III-4)	13,500	22.23	8,725	14.37
New High-Rise Elevator Apartments (See Table III-5)	17,700	20.83	11,260	13.26
New Six-Story Elevator Apartment (See Table III-6)	15,670	20.22	13,175	17.59[a]

a. Another 221 (d)(3) new construction program for which certified costs became available in February, 1968, was the Haven Plaza project (371 units) on the Lower East Side of Manhattan. According to the calculations, construction costs ran approximately $19.60 per usable square foot. (It is possible that a partial reason for the higher cost of this project is a result of garage construction whose costs cannot be accurately separated from general construction expenses.)

Table III-4 shows the estimated costs of the West 114th Street old-law tenement rehabilitation work (458 units) done by conventional techniques. The estimated total costs per usable square foot are $22.23, compared with $53.30 for the RRDP. Per unit costs are respectively $13,500 and $26,400. However, actual costs for the conventional rehab work may go above the estimates, which, for an unfamiliar process such as rehabilitation, are likely to be on the low side. Even the estimated costs, however, are markedly above the cost per usable square foot of new elevator apartments recently built for public housing and under 221(d)(3) programs. Dwelling unit costs for the conventional rehab structures are lower than for new structures, but only because the units are so much smaller.

Table III-6 shows also the total project cost of a six-story semi-fireproof elevator 221(d)(3) project of 38 units to be $20.22 per usable square foot (or $17 per usable square foot excluding kitchen-bathroom costs). The construction costs per unit come to approximately $13,175, and both units and rooms are approximately 75 percent larger than in the RRDP demonstration building. Table III-5 shows budgeted new construction costs (which we are assured will be close to final certified costs) for six public housing projects with 2,962 units in fireproof, highrise, elevator buildings; these costs are very close to the certified costs of the 221(d)(3) project previously cited.

Table III-4

OLD-LAW TENEMENT REHABILITATION COST ANALYSIS
CONVENTIONAL METHODS
West 114th Street
(458 Units – 1,969 Rooms)

	Dollar Costs[a]		Cost Per Net Usable Square Ft.	
Acquisition		$890,000[b]		$ 3.20
Site Preparation		206,550		.74
Demolition, Site Clearance and Fill	$203,950		$ .73	
Piles and Abnormal Foundation Conditions				
Relocation[b]				
Off-Site Improvements				
Test Borings and Topo Survey	2,600		.01	
Construction Costs		3,995,762		14.37
On-Site Improvements[c]	3,916,962		14.09	
Residential Structures				
Ancillary Structures				
Site Work				
Insurance and Performance Bond	78,800		.28	
Builder's Home Office Overhead				
Construction Fees				
Fees		319,025		1.15
Architect	209,025		.75	
Legal and Organization	110,000		.40	
Carrying and Financing Charges		598,348		2.15
Interest During Construction	292,000		1.05	
Taxes During Construction	75,000		.27	
Supervising Government Agency Fees	39,188		.14	
Financing Expense	86,787		.31	
Title and Recording Expense	43,586		.16	
Administrative & Accounting Exp.	61,787		.22	
Other Expenses (Selling and Promotional)				
Working Capital and Contingency Reserve		169,015		.61
Total Estimated Project Cost		$6,178,700		$22.23
Estimated Cost (Excluding Kitchen and Bathroom Costs)[d]		$5,033,700		$ 18.13
Gross Square Feet – Not Available				
Net Usable Square Feet[e]	277,981			

a. FHA mortgage commitment for West 114th Street.
b. Relocation costs included in acquisition costs.
c. Includes builder's profit
d. Excludes the estimated cost of $2,500 per kitchen and bathroom.
e. Net usable square feet computed from measurements based on typical building analysis by Buildings System Development Corporation.

Table III-5

NEW CONSTRUCTION COST ANALYSIS
HIGH-RISE ELEVATOR APARTMENTS, FIREPROOF
(2,962 Units – 13,573 Rooms)

	Dollar Costs		Cost Per Net Usable Square Foot	
Acquisition		$6,861,500		$ 2.73
Site Preparation		5,609,500		2.23
Demolition, Site Clearance & Fill	$5,380,600		$ 2.14	
Piles and Abnormal Foundation Conditions				
Relocation	209,100		.08	
Off-Site Improvements				
Test Borings and Topo Surveys	19,800		.01	
Construction Costs		33,367,000		13.26
On-Site Improvements [a]		b	b	
Insurance and Performance Bond		b	b	
Builder's Home Office Overhead		b	b	
Construction Fees		b	b	
Fees		942,000		.37
Architect	678,000		.27	
Legal and Organizational	264,100		.10	
Carrying and Financing Charges		3,103,400		1.23
Interest During Construction	1,042,000		.41	
Taxes During Construction				
Supervising Government Agency Fees	1,106,700		.44	
Financing Expense				
Title and Recording Expense	9,400		—	
Administrative and Accounting Expense	945,300		.38	
Other Expenses (Selling and Promotional)				
Working Capital and Contingency Reserve		2,540,000		1.01
Total Estimated Project Cost		$52,423,500		$20.83
Estimated Cost (Excluding Kitchen and Bathroom Costs)[c]		$45,018,500		$17.88
Gross Square Feet [d]	3,051,270			
Net Usable Square Feet [d]	2,517,298			

a. Excludes cost of community space within residential structure and community center. Includes builder's profit.
b. No breakdown available.
c. Excludes estimated cost of $2,500 per kitchen and bathroom.
d. Gross and net square feet based on an analysis of floor plans.

Source: New York City Housing Authority. Budgeted costs for six projects, three located in Manhattan and three in Brooklyn.

Table III-6

NEW CONSTRUCTION COST ANALYSIS
SIX-STORY ELEVATOR APARTMENT – SEMI-FIREPROOF
(38 Units – 140 Rooms)

	Dollar Costs		Cost Per Net Usable Square Foot	
Acquisition		$16,264		$ .55
Site Preparation		1,088[a]		.04
Demolition, Site Clearance & Fill				
Piles and Abnormal Foundation Conditions				
Relocation				
Off-Site Improvements	$ 420		$ .02	
Test Borings and Topo Survey	688		.02	
Construction Costs		518,282[a]		17.59
On-Site Improvements[b]	512,881		17.41	
Residential Structures				
Ancillary Structures				
Site Work				
Insurance and Performance Bond	834		.03	
Builder's Home Office Overhead[b]				
Construction Fees	4,567		.15	
Fees		20.650		.70
Architect	12,100		.41	
Legal and Organization	8,550		.29	
Carrying and Financing Charges		39,633		1.34
Interest During Construction	14,492		.49	
Taxes During Construction	1,500		.05	
Supervising Government Agency Fees	4,097		.14	
Financing Expense	15,282		.52	
Title and Recording Expense	3,712		.13	
Administrative and Accounting Expense	550		.02	
Other Expenses (Selling and Promotional)				
Working Capital and Contingency Reserve				
Total Estimated Project Costs		$ 595,917		$ 20.22
Estimated Cost (Excluding Kitchen and Bathroom Costs)[c]		$ 500,917		$ 17.00
Gross Square Feet[d]	35,717			
Net Usable Square Feet[e]	29,466			

a. Some site preparation costs included in construction costs.
b. Includes builder's profit and builder's home office overhead.
c. Excludes estimated cost of $2,500 per kitchen and bathroom.
d. Total square feet of structure (5,102.4) X 7 floors.
e. Net square feet estimated at 82.5 percent of gross square feet.

Source: Stuyvesant Manor Development Corporation. This is a 221(d)(3) limited profit project. Cost figures are certified actual costs.

Table III-7

BREAKDOWN OF COSTS PER USABLE SQUARE FOOT RAPID REHAB DEMONSTRATION PROJECT AND OTHER RECENTLY BUILT NEW AND REHABILITATED HOUSING

	Rehabilitated Old-Law Tenements		New Construction	
	RRDP East 5th Street (Actual Costs) 49 Units	Conventional West 114th St. (Budgeted Costs) 458 Units	High-Rise Elevator Apartments (Budgeted Costs) 2,962 Units	Six-Story Elevator Apartments 221(d)(3) (Actual Costs) 38 Units
Acquisition	$ 4.46	$ 3.20	$ 2.73	$ .55
Construction	45.00	14.37	13.26	17.59
Other	3.84	4.66	4.84	2.08
Total Cost	$53.30	$22.23	$20.83	$20.22
Adjusted Cost	$45.10	$18.13	$17.88	$17.00
Average Room Size ($ft.^2$)	147	141	185	210
Average Unit Size ($ft.^2$)	495	607	849	775

Notes: Cost data. Figures for the West 114th Street rehabilitation project and for the New York City Public Housing projects are estimates, taken respectively from FHA mortage data (Form 2264) and detailed cost estimates and budgets. (Cost data for the former project were reconfirmed in February 1968, after several of the buildings had been rehabilitated.) Figures for the Rapid Rehabilitation Project are allocations to the demonstration project building from the total project costs. Figures for the 221(d)(3) project are certified actual costs.

Adjusted costs are total costs minus estimated plumbing and equipment costs of kitchens and bathrooms.

Some Reasons for High Costs

First, because the 48-hour schedule required round-the-clock work, over 60 percent of the labor was charged at double-time rates. A total of 8,400 man hours was accumulated during the period. Despite the notably successful critical path scheduling, the sheer numbers must have made for great inefficiency, relative to productivity possible with

a less hectic schedule.[1] Second, no economies on bulk purchases were possible because materials were bought in small quantities, primarily because many different materials were being tested. Third, because subcontractors could not give firm estimates on the unfamiliar techniques employed, cost-plus contracts were required. Fourth, as elsewhere noted, the technique of preassembling kitchen-bathroom units and lowering them into place with heavy construction cranes proved to be very costly, though it saved on-site construction time. Fifth, a long period from acquisition to occupancy raised costs of interest and taxes, with no offsetting income from the two vacant buildings. Delays in obtaining building permits and certificates of occupancy, and interruptions by strikes, raised interest and tax costs.

A critical question concerns the cost of replicating the project in volume. A conclusive answer would require detailed engineering studies of a substantial number of buildings, and the mounting of a greatly expanded demonstration effort, with tighter cost-control procedures. But we see no reason to expect that repetition would bring costs to anywhere near the level of conventional rehabilitation or new construction.

It is clear that the greatest cost-inflation factor was speed, which necessitated double-time rates for 60 percent of the labor during the 48-hour period and doubtless decreased productivity. A 25 percent gain in productivity would reduce labor costs by about $1,900 a unit, or about $4.50 a usable square foot. A 25 percent gain in productivity combined with regular rates would have cut the cost of the work done in the 48-hour period by 50 percent: about $4,700 a unit and $9.50 per usable square foot. But a saving of even this magnitude would still leave costs per square foot far above that of new housing. Although costs per unit would be comparable to the estimated costs of some recently completed new housing units, the latter are far superior in size, usable space, light, air and other amenities.

An original assumption about the advantage of speed, namely, that it can reduce construction and related costs without sacrificing quality, thus was not validated by the demonstration. If cost and quality factors are isolated and other factors remain constant, the impact of speed on cost and quality can be roughly summarized as follows:

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1. Because of the public ceremony planned to mark the completion of the project, with extensive television and news coverage, completion on schedule became absolutely necessary, regardless of cost.

	Cost	*Quality*
Acquisition	more	less
Site preparation	more	same
Construction:		
Roof	more	same
Exterior walls	same	same
Floors	more	less
Walls	more	less
Ceilings	more	less
Kitchen-bathroom (including plumbing and electrical)	more	same
Fees:		
Architectural	same	less
Legal and organizational	same	not applicable
Interest and taxes	less	not applicable
All other	same	not applicable

Assumptions underlying this table are described in the following text.

To use a 48-hour technique economically requires standardized plans applied to standardized buildings. Acquisition possibilities thus are narrowed to groups of buildings meeting specified criteria. This limits maneuverability on purchase prices. With occupied buildings (there is no point to fast rehabilitation of unoccupied buildings) the asking price is higher than in vacant structures. (The occupied building cost 22 percent more than each of the vacant structures in the demonstration.)

The devices to assure speedy interior renovation—use of cranes, storage in light shafts, construction of debris chutes—raise costs.

Quality tends to be sacrificed. With a little more time on the demonstration project, windows could have been better insulated with plastic foam at little extra cost, floors leveled with polyeurethane (also at little extra cost), and ceilings sprayed at the site for better quality. The preassembled cores saved time on the site but, since they were all handcrafted off the site, costs were raised owing to the necessity of transporting and placing the heavy preassembled units.

Interest and taxes can be reduced by shortening the time of construction, but these savings apparently are far more than offset by the added costs of labor under the pressure of an extremely tight schedule. In summary, we may expect that fast rehabilitation such as the

48-hour demonstration will result in higher costs and lower quality than rehabilitation done conventionally. Unless rapid rehabilitation serves other objectives, it cannot be advocated as an economical process.

Adjusted Cost Estimates by HUD Analysts

Further attempts to break down costs of the project into "actual" construction costs and costs attributable to the "demonstration" aspects of the project have been made by HUD analysts. The comparative figures are as follows:

	Per Unit	*Per Usable Square Foot*[1]
HUD estimates of demonstration and actual costs:		
Construction, total	$24,400	$49
Costs attributable to demonstration aspects of the project	5,600	—
Costs chargeable to actual construction	18,800	38
IPA estimates of costs chargeable to actual construction	22,300	45
HUD estimates of costs under varying conditions:		
Replication of project, using rapid rehab techniques, no overtime		
1 building	12,100	24
10 buildings	10,500	21
100 buildings	10,000	20
Actual costs of recently completed conventional rehabilitation of old-law tenements and new construction:		
Conventional rehabilitation	8,725	14
Public housing high-rise elevator apartments	11,260	13
Six-story elevator apartment (221[d][3])	13,175	18

Estimates for replication of the rapid rehabilitation process can be proved out only by large-scale experimental projects. The striking

1. Calculations respecting rehabilitation of the tenement on East 5th Street and replication of this process are based on an average of 495 usable square feet per dwelling unit.

fact, however, is that the lowest estimate for massive employment of the rapid rehab technique, $20 per usable square foot, is above costs of new public housing and 221(d)(3) units. Rapid rehab costs, per usable square foot, can be brought to the level of new housing costs only by liberating the process from constraints imposed by building codes and trade-union restraints. But such liberation would also markedly reduce the cost of new housing.

The existing cost data, and estimates derived therefrom, do not reflect several important considerations. As previously noted, the rehabilitated structures are deficient as to flooring, wall materials, and ventilation, and omit amenities such as provision of laundry facilities. It appears that the materials and construction techniques utilized require a high level of maintenance. (Low-income housing generally requires the use of sturdier materials and fixtures in vulnerable places than does higher-income housing.) Correcting only the most obvious deficiencies in the rapid rehab units would further raise the original construction cost.

Conclusion

What this project demonstrated was that old-law tenement rehabilitation, done in a very short period in order to minimize the problem of tenant relocation, produced grossly inferior housing, with construction costs running three or more times as much per usable square foot, and as much as 100 percent more per unit than new construction costs. In our opinion, there is nothing in this demonstration to indicate that high volume rehabilitation work, under existing wage rates, work rules, and code restrictions, would bring costs down to reasonable levels. The spread between costs incurred on this project and costs of more conventional methods, is simply too great to be overcome. And. as noted above, even conventional rehabilitation of old-law tenements turns out to be about as costly, per square foot of living space, as new construction. This finding should not be surprising. What the old-law tenement buildings provide is nothing more than a shell, which must be gutted before rehabilitation can even begin. The shell, however, is a minor component of the construction cost of housing. Where interior construction, which is a major component, is done by conventional handicraft methods compounded by round-the-clock overtime and excess manpower to assure rapid completion, it is only natural that the total construction cost would exceed that of new housing.

Changes in codes and trade union practices, of course, would make considerable difference in absolute construction costs. We estimate,

for example, that kitchen-bathroom units such as those employed on the demonstration project could be turned out, by mass production methods, for around $1,250 per unit, less than a third of the cost of pre-assembling them by handicraft methods on a pier. The cost might be even further reduced by use of new materials (such as the molded plastic technology employed in the Habitat project at Montreal). But these techniques can also be applied to new housing, so they would not necessarily change the relative difference between new and rehabilitated housing costs.

Finally, it should be noted that rents are not exclusively a function of construction costs, and that reducing construction costs ordinarily will not produce a substantial reduction in rents. Computations with RRDP data indicate that reducing construction costs 50 percent below what the mortgage allowed (which figure was greatly below costs actually incurred) would reduce rents by only about 20 percent.[1]

1. Rents are predicated on mortgage data, not on actual costs.

Chapter IV

Trade Union Relations

Despite the tremendous volume of building in New York City (or perhaps because of it), prevailing residential construction practices are among the country's most old-fashioned. As a result, the decision to conform to existing trade union practices, insofar as possible, necessitated costly concessions and compromises.

The scheduling of so much construction work in 48 hours using operating engineers, plumbers, sheet metal workers, carpenters, ironworkers, electricians, painters, mason tenders (laborers) and plasterers, within the vagaries of each union's rules required considerable planning, and a virtual disregard for cost.

It is common knowledge that much of the rehabilitation work in New York (particularly in brownstones and old-law tenements) is done by nonunion labor. The nature of the work done (removing debris, gutting interiors and rebuilding) is necessarily a handicraft operation and therefore slow and expensive. Private investors and contractors "make do" on all but "licensed" work with unskilled or semi-skilled laborers. Plumbing, heating and electrical work is subcontracted to master plumbers and electricians who, in turn, use apprentices and helpers to cut costs. When union regulations are followed—as they were in the demonstration—special, costly arrangements became necessary.

The ironworkers and carpenters "shared" the emplacement of the core, necessitating a crew of eight instead of six. The limitation of functions which could be performed efficiently by crane (partly because of scheduling difficulties and partly because of jurisdictional problems) increased manpower requirements. (The demolition contractor indicated that in addition to crane operating engineers, ironworkers would be required to hook up the "bucket" for removal of debris, so that plans were changed to use chutes rather than the crane for debris removal.)

Two plumbers' locals of the same international divide the city into two jurisdictions. Manhattan Local 2 would not assemble and install cores developed in Queens, using Local 1 labor. A second proto-

type had to be developed in the Bronx, using Local 2 labor, whose members assembled the cores on a Manhattan pier. This experience gives little reason for optimism about reducing costs in Manhattan through factory fabrication of large-scale components such as kitchens and baths produced, for example, in Canada or Virginia.

Union Contracts and Subcontracts

Cumbersome contracting and subcontracting arrangements were required. In some instances the decision to subcontract was mandated by union regulations; in others, by choice of the general contractor. In each instance, whether contracts were with union locals or with subcontractors, considerable negotiating time was required. Delegation of authority and responsibility by the general contractor to the union local or subcontractor set up extra levels of communication, supervision and control. The list below summarizes contractual and subcontractual relationships:

1. Direct Contracts between Unions and CONRAD:
   a. interior painting,
   b. laborers (mason tenders),
   c. cement masons,
   d. operating engineers,
   e. brick layers,
   f. carpenters (also subcontracts).

2. Subcontracts between CONRAD (general contractor):
   a. exterior painting,
   b. carpentry (also direct contract),
   c. electricians,
   d. plumbers.

A number of special arrangements were made, particularly with the carpenters. A subcontract was entered into with a union contractor experienced in moveable partitions, who dealt with the union on off-site fabrication and all jurisdictional disputes. CONRAD conducted direct negotiations with the carpenters' union on manpower requirements during the demonstration and on relaxation of overtime payment requirements (no success was achieved on the latter point). Carpentry materials had to be obtained through a carpentry contractor. As noted in the report by the general contractor, "This would have a negative effect on price discounts for quantity purchasing and standardization. It means also that the contractor would add his mark-up to the material."

Union Attitudes

The primary objective of the general contractor was to assure that the demonstration would take place with little or no interruption due to union disputes. But he could not prevent a delay of six months from a general plumbers' strike in Manhattan and the Bronx.

The carpenters' union viewed the demonstration as an opportunity for additional employment in a trade suffering from underemployment. (Almost 70 percent of all workers and over 90 percent of all man-hours were in this trade.)

From the beginning, the plumbers' union and the building and trades council were cautious about giving consent to preassembly of kitchen-bathroom units, particularly in locations out of the union's geographic area. Although no effort was made to test union reactions should service cores be imported from outside the city, it is almost certain that there would have been strong resistance.

Future Union Relations

Any massive construction program in New York City, whether new construction or rehabilitation, will require additional manpower in certain trades, particularly if present restrictive practices continue. (The general contractor experienced some shortage of skilled electricians and skilled plumbers.) For speed and possible economy of operation, however, mass production of a simplified core off-site is essential for any large-scale program. Obviously, mass production would create opportunities for use of new simplified skills, for more employment, and for employing members of minority groups. But it is doubtful if these things by themselves are sufficient to break down resistance to institutional change. One indication of such reluctance to change is evident in reservation of various trades to many sections of the proposed new modernized city building code.[1]

1. New York City's New Building Code, *New Building Codes—Problems and Solutions, A Case Study*. Building Research (January-February 1967).

Chapter V

The Red Tape

The purpose of this discussion of dealings with the bureaucracy is to identify obstacles and procedures which must be overcome if housing technology, and construction and rehabilitation generally, are to be advanced in New York City.

The construction contractor for the demonstration project was a California-based corporation with no residential construction experience in New York City. Being relatively unfamiliar with the residential requirements of the New York City building code, he selected supporting personnel for knowledge and skills which would supplement his own technical contributions. Architects who had designed the rehabilitation of 38 similar old-law tenements on West 114th Street were retained for this demonstration, along with a construction consultant with 40 years of experience in major construction jobs in the city.

The Rent and Rehabilitation Administration and an official of the Office of the Housing and Development Administrator also provided liaison with city agencies. Officials of the Washington Office of the Department of Housing and Urban Development maintained continuous contact and intervened with the Buildings Commissioner, the Housing and Development Administrator and even the Mayor when deadlocks developed. But even such action did not eliminate considerable delay in obtaining building permits and certificates of occupancy.

Building Permits

An application for a building permit required for new construction or major renovation is stamped, numbered, and accepted for consideration only if it conforms to the requirements of the Buildings Department. It must, for example, be signed by the owners, and plans and specifications for work to be done must be submitted for review.

The construction contractor endeavored initially to meet all requirements of the building code to avoid delay arising from unusual materials or procedures. Preliminary plans and specifications either conformed to the code or to variances already established by prece-

dent. The only exception was in the design of interiors where the architect had to ignore certain code restraints in order to take full advantage of the proposed construction system.

Preliminary plans and specifications were completed and the permit was applied for on February 11, 1966. Since a six-week delay is normal before submitted plans are readied for review, special efforts were made to shorten this waiting period. A meeting was held with the Buildings Commissioner and two of his assistants on February 24. The purposes of the project were thoroughly discussed and the proposed technique was illustrated. Problems which might arise in necessary inspections of the preassembled core off-site also were discussed. The Commissioner requested that a letter be submitted to him so that he could expedite plan examination. Even with special processing, the permit was not issued until April 5, 1966.

The first snarl resulted from the Buildings Department's requirement that the owners sign the application. The Carolyndale Foundation could not acquire title to the property until an FHA mortgage was issued. A mortgage could not be issued until a building permit had been obtained. This vicious circle was broken by securing the owners' signatures on the application and "holding them harmless" (free of any responsibility) for any consequences. This tangle consumed a week.

Thereafter, special efforts were made to expedite the application. All communications were hand-delivered; daily checks were made of progress through the agency. Attempts were made to minimize internal delays from such causes as number of changes on the application, absences of examiners and inspectors, determining chains of command, etc.

Notwithstanding, substantive objections by examiners and amendments to the plans consumed the entire period from March 4 to April 5.

The Buildings Commissioner's letter was valuable in obtaining appointments and prompt consideration; without it, the time required might have been double or more. But the letter could not waive code requirements for the purposes of the experiment. Nor did it change departmental procedures which require examination of amendments to plans by at least six echelons of the department.

Though many changes were relatively minor, the effort in obtaining approval was not in proportion to their significance but was contingent on the ladder of required approvals. The construction contractor stated that only one level of approval could be secured in any one day.

Other Permits and Approvals

Other permits were required before construction could begin, some

issued by the Department of Buildings and some by other agencies. Each required payment of a fee, an insurance certificate and a bond to protect the city. Some illustrations are:

1. Sidewalk permit for closing off part of sidewalk.
2. Street permit for using street space.
3. Bridge permit for sidewalk overhead protection.
4. Chute permit for debris removal.
5. Crane permit for use of crane in street.

In addition to formal permits, cooperation and assistance of other agencies were required. The Department of Marine and Aviation assisted by locating a pier and making lease arrangements for its use as a site for fabrication of service cores. The Fire Department, Police Department, and Department of Traffic were informed so that streets immediately adjacent to the buildings could be utilized with the cooperation of foot patrolmen, meter maids, and inspecting firemen. Though both the Office of the Coordinator of Housing and Development and the Rent and Rehabilitation Administration assisted in arranging channels of communication, each request or meeting consumed additional time and caused additional delay.

Inspections

The Buildings Department makes continuous inspections and tests during construction to assure adherence to approved plans and specifications, and to assure the safety of installations.

After construction began, a meeting was held with the Buildings Department on April 28, 1966, to discuss required variations from normal inspection practices. The Deputy Commissioner, while assuring the group of departmental cooperation, specifically mentioned the limitations of the multiple-dwelling law and the trade unions who would be quick to inform the agency of any deviation from the law.

Of particular concern was an off-site plumbing test in order to avoid testing and inspection delays in the 48-hour period. The consensus at the April 28 meeting was that a pressure test could be made off-site and the on-site test would be a relatively simple one.

The city inspection program consists of both a general inspection and specific inspections of plumbing, sheet rock, steel, heating and electrical systems. Some difficulties arose because of differences of opinion between different inspectors: delays occurred because scheduled inspections were not made on schedule. The primary cause of difficulty, however, arose because of continual experimental changes made by the contractor without corresponding changes in filed plans.

Deviations from plans were noted by inspectors and continual revisions and amendments had to be submitted. Some were not acceptable to plan examiners and extensive negotiations were required to reach compromise solutions. These negotiations resulted in more amendments, more inspections, more negotiations and either formal approvals or final objections. Since a certificate of occupancy could not be issued until all objections were resolved, delays multiplied.

Certificate of Occupancy

From April 5 to November 10, 1966, the construction contractor was involved with the testing of materials, the development of schedules for a 48-hour rehabilitation, and the preparation of amendments to plans and specifications. To assure that no delays would be encountered in a timed test planned for one of the experimental buildings (637), work was completed on the first building (635) and a major effort was made to obtain a certificate of occupancy for 635. An inspector sent to make the final inspection prepared the following list of objections:[1]

"1. ½ inch protection required under kitchen cabinets above range.
2. Supports for hung ceilings do not conform to C-26-461.
3. Masonry filler required at window heads.
4. Burned roof beams have not been replaced.
5. Painting and scraping of fire escapes—not satisfactory.
6. Combining the vents for the apartment space heaters into one common flue—not satisfactory.
7. Submit for approval, amendment showing new layout of basement areas.
8. Support of floor beams that were cut for cores—not satisfactory.
9. Bridle irons required at all headers, and at trimmers over four feet long.
10. Submit for approval, amendment showing three core hole covers and vents for fifth floor hung ceiling.
11. Submit for approval, amendment indicating method of supporting roof beams that were cut for cores.
12. Fire stopping required between all floors at unit area.
13. Board of Standards and Appeals approval required for tile use in baths.
14. Submit for approval, amendments showing all changes from approved plans to conform with project as being built, to be done as the job progresses."

1. This list was not formally submitted to the construction contractor until almost a month after preparation, during which time informal discussions and negotiations proceeded with the inspector at the site.

A number of the objections required submission of amendments because they represented deviations from filed plans. Others merely stated that the material or system was not satisfactory; no indication was furnished on steps required to make such installations satisfactory.

On December 13, 1966, a meeting was held to discuss means of overcoming these objections. Drawings were corrected, amendments submitted, and special efforts were made by the Washington office of the Department of Housing and Urban Development to obtain approvals. All but one of the objections were overcome: an objection to the heating system. (Number 6 in the above list.) Even on this last item, no clear-cut objection on the heating system could be obtained from the Buildings Department which would enable an application for variance to the Board of Standards and Appeals. The construction contractor was placed in the position of being denied a certificate of occupancy with no basis for appealing the decision to higher authority.

Although no certificate of occupancy had been obtained for the first building (635), a considered decision was made by Washington to proceed with the timed demonstration in the second building (637). One of the important elements in a 48-hour test was some assurances that a certificate of occupancy would be issued and that tenants could return to their apartments upon completion of rehabilitation. It was necessary, therefore, to plan an inspection program during the 48-hour period as part of the test even though 637 East 5th Street was not occupied. The Buildings Department would not commit itself to any approval at the end of the 48-hour "dry run" on the second building because approved plans were not on file. Specifically, approvals of the heating system had not been forthcoming.

Despite these problems, the "dry-run" demonstration on the second building was held January 24 to 26, 1967, and resulted in improved planning for the complete reconstruction of the demonstration building (633) in 48 hours. Specifically, the contractor learned that a special permit is required for working at night; that building inspectors have no established procedures for night work; that all permits (sidewalk, street, building, chute, crane, etc.) are personally inspected by the precinct police captain; and, most important, that usually two to three days elapse between inspection and approval of plumbing.

No certificate of occupancy was issued upon completion of the 48-hour test in 637 because (1) the heating system installed as part of the cores had not met the approval of the Buildings Department in 635, and consequently was not approved in 637, and (2) plumbing pressure tests held off-site were not according to code. (This alternate plumbing test had not been raised as a subject for discussion in the

December 13 meeting because original agreements had been reached on the preceding April 28 for utilization of an alternate inspection procedure.) But the Buildings Department finally was not willing to accept an off-site test and asked that all fixtures be removed and plugs installed for pressure tests on-site. After considerable negotiation, an off-site plumbing test procedure was approved. No progress was made, however, on objections to the heating system. Since the demonstration building (633) already had a conventional heating system which conformed to the code, this obstacle could be by-passed for purposes of the demonstration.

More conferences were held to assure full cooperation during the 48-hour rehabilitation planned for April 11 through 13, 1967, in the demonstration building (633). Procedures were devised for an inspection program; night inspections were scheduled at the critical points within the 48-hour period; a plumbing test schedule was approved.

As the 48-hour demonstration proceeded, difficulty of obtaining a comprehensive list of objections arising proved troublesome. All inspections were tentative and all lists were incomplete until the final inspection. As objections were removed and reinspected, new objections appeared.

With considerable pressure from above, all problems were resolved, and a certificate of occupancy for 633 was issued on the 48th hour. The other two buildings (635 and 637) were granted temporary certificates of occupancy pending approval of the heating system. An appeal for a heating system variance was sent to the Board of Standards and Appeals, which, after a three-month review, ruled that the Building Department had jurisdiction to approve a waiver. A permanent certificate of occupancy was issued August 10.

Another sore point had been the high rentals charged by the City's Department of Marine and Aviation for the use of an otherwise vacant pier in assembling kitchen-bathroom cores. (The Department had no choice in the matter under existing City regulations.) Subsequently, regulations were modified to allow reduction of rents for such special purposes.

Experimentation within the established framework of existing agencies proved to be extremely cumbersome. Existing channels of command within such agencies do not provide necessary flexibility in introducing new materials or new techniques; new and streamlined arrangements will be required. As a result of the East 5th Street demonstration, a task force was established by the Housing and Development Administrator to develop such arrangements.

Chapter VI

Reactions and Attitudes

The Tenants

Only one of the three buildings acquired for the rapid rehabilitation demonstration project (RRDP) was occupied; this was the one reserved for the 48-hour demonstration. At acquisition all 20 units in the building were occupied. After tenants were informed of the experiment, and before work was begun, nine households moved, leaving only 11 in the building.

Selected Tenant Characteristics

The reasons for the exodus are not known, but comparison of the movers and the remaining families reveals some interesting differences. The majority of movers were one- and two-person households who had lived in the building no more than one year and paid over $50 per month rent. Those remaining were mostly two-or-more-person households, most with young children. They were also the most stable families (those residing in the building for at least two years) and those with the lowest rentals (under $50 per month).

Seven of the 20 original households had been self-supporting; four of these moved. The three who remained were the lowest income families (under $70 per week); two of the three had been tenants for over 10 years.

Five welfare-dependent families moved, eight remained.

Limitations of Tenant Response

The demonstration proved of limited value as a test of tenant reactions. The peculiar conditions of the demonstration undoubtedly influenced tenant responses. These reflected concern with:

1. Noise and dust from the two adjacent structures where experimentation proceeded over a long period.

Table VI-1
CHARACTERISTICS OF TENANTS

	Number of Households	
	Prior to Acquisition	Immediately Prior to Rehabilitation
Total	20	11
Number Surveyed	19	11
Household Size		
1-Person	5	2
2-Person	7	4
3-Person	2	1
4-Person	3	2
5-Person	2	2
Not Reported	1	0
Household Head – Sex		
Male	9	5
Female	10	6
Household Head – Age		
Under 30	3	0
30 – 49	6	3
50 – 64	6	5
65 and Over	3	2
Not Reported	1	1
Number of Children		
0	10	4
1	2	2
2	4	2
3	2	2
4	1	1
Source of Income		
Employment	6	2
Pension	1	1
Welfare	12	8
Income (Excluding Welfare)		
Under $30 a week	1	1
$30 – $59	–	–
$60 – $69	2	2
$70 – $79	–	–
$80 – $89	3	–
$90 and Over	1	–
Duration of Tenancy		
1 Year or Less	11	4
1½ – 3 Years	4	3
6 – 7 Years	2	2
10 Years and Over	2	2

Table VI – 2

RENTS AND OCCUPANCY
BEFORE AND AFTER REHABILITATION

	Before	After
Total Households	11	11
Rent		
Under $50 Per Month	4	–
$ 50 – $ 69	5	–
$ 70 – $ 79	2	–
$ 80 – $ 89	–	5
$ 90 – $118	–	–
$119 – $121	–	6
Persons Per Room – Average		
.50 or Less	1	3
.51 – 1.00	7	8
1.01 – 1.50	2	–
1.51 and Over	1	–

2. Extensive publicity given the project in the press and other media.

3. The fact that participants and observers were in and out of tenants' apartments for several months.

4. Tenants' knowledge that they were part of the experiment and were being observed and their reactions evaluated.

The demonstration yielded no information about tenant attitudes toward rent increases resulting from rehabilitation. Most of the returning tenants were welfare recipients, not concerned with payment of higher rents. Self-supporting families were assured of rent supplements if they could not afford rent increases. It was therefore impossible to ascertain whether tenants felt the renovated apartments were "worth" the rents charged.

Pre-Rehabilitation Responses

On April 7, 1967, three days before rehabilitation of the demonstration building was begun, nine of the families residing in the

building were interviewed. The attitude of the tenants, preoccupied with packing and other relocation preparations, is reflected in the following summary:

1. Despite advance work done inside and outside the apartments (e.g., drilling holes in floors and ceilings within the units, installing radiators and outside doors, setting up planks and storing materials across air shafts and painting hallways,) only two of the tenants were seriously inconvenienced while the project was under way. One complained of the lack of privacy and attributed an illness requiring medical care to the dust and cold from the debris shaft located outside his bedroom window. Another tenant claimed that the bedroom ceiling began to fall when a radiator was dropped in the apartment above.
2. Some families expressed the need for larger apartments because of dissatisfaction with present sleeping arrangements. In four units at least one bedroom was shared by three children (some of opposite sexes), and in two other units a child slept in the living room.
3. None of the families interviewed showed any resistance to, or concern about, temporary relocation although most had not seen the temporary quarters and a few were uninformed as to where they would be relocated. Attitudes toward relocation may be attributed to the tenants' knowledge that they would be gone only a few days. Assurances of a food allowance, buses to transport children to school, and packing assistance all contributed to acceptance of temporary relocation.
4. All of the tenants had seen and liked the newly-renovated units in the two experimental buildings. Some were impressed with new appliances and others with the comfort, convenience, privacy and space the apartments seemed to offer. A few thought the kitchen and/or other rooms too small. One tenant questioned whether the bedroom in the one-bedroom unit could accommodate twin beds.
5. Only two tenants expressed a preference for living in high-rise public housing and gave as reasons "lower rents" and "a better environment" for such a preference. Other tenants mentioned fear of elevators and lack of privacy in public housing.

Relocation Procedure

All tenant possessions were packed, tagged and stored in moving vans parked along East 5th Street. The temporary relocation of tenants to the Broadway Central Hotel on Broadway and East 3rd Street commenced on Monday, April 10, managed jointly by the owner and the City Rent and Rehabilitation Administration. The last tenants were moved early Tuesday morning, April 11, immediately before the start of the 48-hour countdown.

Subsequent tenant interviews revealed that all tenants were pleased with the temporary hotel accommodations, with the food allowance ($5.00 per person per day), and the transportation arrangements. In fact, some regretted they could not remain longer in the hotel.

Post-Rehabilitation Responses

Ten days after moving into the newly renovated apartments, nine of the returned families were interviewed again. Their responses, based upon actual living experience within the unit, disclosed the following:

1. Most occupants of the one-bedroom units were less than satisfied with some feature of the new apartment. Most expected or hoped to move to another apartment, either within the building or in one of the other two vacant rehabilitated structures. The reasons for their dissatisfaction, for the most part, were related to (a) the kitchen-living room layout and (b) the size of the apartment.

The tenants in the one-bedroom units were unanimous in their criticism of the open kitchen-living room design. They disliked having "the kitchen in the living room" and missed the privacy offered by an enclosed kitchen and a separated living room formerly available in the railroad layout. All preferred the layout in the two other renovated buildings. One tenant thought the pre-rehabilitation room design was even better.

Three two-person households required separate bedrooms either because the two persons were unrelated or one was ill. In each instance, one person had to sleep in the living room since no two-bedroom apartments had been provided in the plans. The small size of the bedroom precluded the possibility of using twin beds where such an arrangement was desired. One tenant, formerly able to fit twin beds into the bedroom, was forced to put one bed in the living room. A two-person family, one a sick child, requested and was given a three-bedroom unit for greater convenience, no two-bedroom units being available (a waiver of occupancy standards).

2. Occupants of the three-bedroom units were more satisfied. No one complained of layout or space problems. One tenant expressed enthusiasm by saying, "It's like becoming a millionaire."

3. Arranging furniture, particularly in bedrooms, presented problems. None of the bedrooms were sufficiently large to accommodate a free-standing double bed together with other furniture. To provide additional space most double beds were placed against one wall. Obviously, such an arrangement complicates bedmaking. As a solution to the problem, one tenant placed the bed diagonally.

4. Nearly half of the tenants complained of damage to belongings during the moving operation—broken television sets were most frequently cited. Complaints of damage within the apartment were confined to a water leak which stained the heating pipe and ceiling plate, and a broken wash basin leg.

5. None of the tenants expressed a desire to move from the neighborhood. Proximity to schools, parks, and shopping facilities, and reasonable food prices were among the reasons given for preferring the location.

Despite criticism, the occupants were basically pleased with the newness, cleanliness and cheerfulness of the rehabilitated units. These represented an improvement over former living conditions.

Advantage to Tenants of Speedy Rehabilitation

It is usually assumed that either new construction or conventional rehabilitation requires relocation, that places in which to relocate tenants are not available, and that even if they were, relocation is generally not desirable or desired. This demonstration indicated, though on a very small scale, that these assumptions do not invariably hold. Half the tenants in the demonstration building moved out, relocating themselves before the demonstration date.

It should not be assumed that most tenants prefer moving back to the same building or even the same neighborhood. A study of Harlem, for example, reflected a widespread desire to leave the neighborhood.[1]

Other Reactions and Attitudes

Neighborhood

Except for applications for vacant apartments, the reactions and attitudes within the neighborhood could not be quantified. However, interviews with neighborhood groups and leaders revealed a sharp division between those concerned with cost and quality of the product and those concerned with *immediate* improvement and change of the existing environment.

To some degree the extensive involvement of the news coverage affected neighborhood reactions. Most observers in the public ceremony which ended the 48-hour demonstration were carried along in the spirit of adulation heaped on the owner, the contractor, and federal and local officials for their respective shares in the experiment. A cooler, more objective attitude has been observed at several vantage points further removed in time and involvement.

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1. John F. Kraft, Inc., *A Survey of Attitudes of Harlem Residents Toward Housing, Rehabilitation, and Urban Renewal* (August 1966).

A meeting was held with a group of fifteen mothers (and two fathers) residing on East 5th Street between Avenues A and C, who meet daily for two hours to learn English and discuss mutual problems. This group was formed by the East Side Mobilization for Youth. Most of the members are Puerto Rican, many are welfare recipients, all have school-age children and to most the Lower East Side is an enclave where shopping, schools, and neighbors make for a fairly satisfactory environment. All would welcome new housing in the neighborhood. All feel any improvement is better than none. One of the members formerly lived at 633 East 5th Street and moved before the demonstration got under way, to avoid the dust, noise and confusion surrounding the experiment. She is satisfied with her new quarters and has made no effort to apply for one of the renovated apartments. Most of the others had filed applications, impressed by the cleanliness and new appliances. All applicants had applied for the three-bedroom units.

There was a consensus that the three-bedroom units were fairly priced while one-bedroom units were overpriced, but comments on rents are to be discounted by the fact that the Welfare Department pays all or part of rents for many families.

The Mobilization for Youth Housing Division (actively engaged in surveying conditions and mounting projects for housing improvement), which had conducted another experiment in rehabilitation, followed the RRDP with great interest but much skepticism. That skepticism was not dispelled. In the housing director's opinion new housing can be produced, in a better total environment, at little higher cost than rehabilitation if new technology can be introduced.

Similar skepticism concerning the results achieved were voiced publicly and privately by the President of the City Club, the Executive Director of the Citizens Housing and Planning Council, and a number of planners and housing professionals. All were impressed by the speed of construction, but were less than impressed by the quality of the finished product. The promise of economies aroused interest but, as elsewhere noted, these were not realized. Other housing professionals, including a number in city service, reserved judgment until costs were known and durability of materials was tested by experience.

APPENDIX

Characteristics of the City's Worst Housing and its Tenants

The Housing Stock

An overview of the city's housing stock and the dimensions of the housing problem, is shown by Tables A-1 to A-3. In summary:

1. There were in 1965 about 2.8 million dwelling units, an increase of about 7.6 percent over 1960.
2. About 12 percent of all dwelling units are in old-law tenements and about 29 percent in new-law tenements. The number of these structures declined between 1960 and 1965—old-law tenement units by 7.7 percent, new-law tenements by 1.3 percent. At these rates, it would take several hundred years to replace all existing tenements.
3. As of 1960, over 500,000 dwelling units were in deteriorating structures; 276,000 were rated "substandard" by Census definition.[1]

Old-Law and Early New-Law Tenements

Since almost 43,000 old-law tenement structures in many locations exist side by side with an unidentified number of early new-law structures which are not greatly dissimilar, these two are discussed together.

The old-law tenements were built in a number of structural types, of which the "dumbbell" is most common. The "dumbbell" old-law tenement, first constructed about 1879, became the model for

1. Many of the old-law tenements may not be as far gone as those on 5th or 114th Streets. Some systematic program of maintenance and rehabilitation might benefit half of the old-laws and the rest of the Class "A" group, or about 120,000 of the 137,851 Class "A" total.

Table A-1

RESIDENTIAL STRUCTURES AND HOUSING UNITS IN NEW YORK CITY END OF YEAR, 1960 AND 1965

	No. of Structures		No. of Housing Units		Percent Change	
	1960	1965	1960	1965	Structures	Units
CLASS "A" TOTAL[a]	139,608	137,851	1,840,611	1,999,398	−1.3	8.6
Old-Law Tenements[a]	46,410	42,992	363,407	335,594	−7.4	−7.7
New-Law Tenements[a]	50,400	49,886	821,531	811,144	−1.0	−1.3
Multiple Dwelling after 1929	6,931	8,484	478,452	671,067	22.4	40.3
Misc. (including Apt. Hotels)	351	346	33,728	33,416	−1.4	−0.9
Converted Class "A"[a]	35,516	36,143	143,493	148,177	1.8	3.3
CLASS "B" TOTAL[a]	14,031	12,165			−13.3	
Converted Class "B"[a]	13,355	11,486			−14.0	
Lodging Houses	79	80			1.2	
Misc. (including Hotels)	597	599			0.3	
ONE-AND TWO-FAMILY DWELLINGS TOTAL	567,055	591,720	762,864	802,163	4.3	5.2
One-Family	371,246	381,277	371,246	381,277	2.7	2.7
Two-Family	195,809	210,443	391,618	420,886	7.5	7.5
GRAND TOTAL	720,694	741,736	2,603,475	2,801,561	2.9	7.6

a. Class "A" — Buildings with 3 or more apartments used for permanent occupancy. Class "B" — Buildings with rooms used primarily for transient occupancy.
Old-Law Tenements — Built prior to 1901.
New-Law Tenements — Built between 1901 and 1929. } — Include single room occupancy.
Converted Class "A" — One- and Two-Family Dwellings converted to Class "A" — Brownstones and brickfaced variations.
Converted Class "B" — Old- and New-Law Tenements and One- and Two Family Dwellings converted to transient use. Primarily rooming houses.

Source: New York City Department of Buildings, Annual Reports.

Table A – 2

MULTI-FAMILY CLASS A STRUCTURES IN NEW YORK CITY BY BOROUGH 1960 AND 1965 [a]

	No. of Structures as of December 31		Percent Change
	1960	1965	1960-1965
Old-Law Tenements [b]	46,410	42,992	– 7.4
Manhattan	18,247	16,309	–10.6
Bronx	3,409	3,117	– 8.6
Brooklyn	23,330	22,204	– 4.8
Queens	1,222	1,173	– 4.0
Richmond	202	189	– 6.4
New-Law Tenements [c]	50,400	49,886	– 1.0
Manhattan	6,125	5,915	– 3.4
Bronx	10,741	10,713	– 0.3
Brooklyn	25,208	24,960	– 1.0
Queens	8,276	8,248	– 0.3
Richmond	50	50	–
Multiple Dwellings After 1929	6,931	8,484	22.4
Manhattan	1,098	1,522	38.6
Bronx	1,283	1,543	20.3
Brooklyn	2,001	2,353	17.6
Queens	2,455	2,932	19.4
Richmond	94	134	42.6
Converted Buildings	35,516	36,143	1.8
Manhattan	5,194	5,380	3.6
Bronx	4,765	4,827	1.3
Brooklyn	18,204	18,569	2.0
Queens	6,938	6,966	0.4
Richmond	415	401	– 3.4
Total Multi-Family Structures [c]	139,608	137,851	– 1.3
Manhattan	31,006	29,461	– 5.0
Bronx	20,198	20,200	–
Brooklyn	68,750	68,095	– 1.0
Queens	18,891	19,319	2.3
Richmond	763	776	1.7

a. See Table A-1 for definition of Class A.
b. Includes "single-room occupancy" structures.
c. Includes "miscellaneous" category not shown.
Source: New York City Department of Buildings, Annual Reports.

Table A – 3
QUALITY OF NEW YORK CITY HOUSING STOCK 1960

Condition & Plumbing Facilities	All Units (Occupied & Vacant)		Owner Occupied		Renter Occupied	
	Number	Percent	Number	Percent	Number	Percent
TOTAL HOUSING UNITS	2,758,000	100	578,000	100	2,077,000	100
Not Substandard	2,482,000	90	568,000	98	1,838,000	88
Sound,[a] with all plumbing facilities	2,205,000	80	537,000	93	1,600,000	77
Deteriorating,[b] with all plumbing facilities	277,000	10	31,000	5	237,000	11
Substandard*	276,000	10	10,000	2	239,000	12
Sound, lacking facilities	126,000	5	4,000	1	107,000	5
Deteriorating, lacking facilities	66,000	2	1,000	**	58,000	3
Dilapidated [c]	84,000	3	5,000	1	74,000	4

Definitions

a. Sound: housing which is basically in good condition.

b. Deteriorating: housing which requires repairs to items such as foundation, walls, roofs, floors, stairways or ceilings, if it is to continue to provide safe and adequate shelter.

c. Dilapidated: housing which endangers the health, safety or well-being of its occupants.

Notes

*Substandard housing includes: (1) units in sound or deteriorating structures which lack private plumbing facilities (hot running water, a toilet, a bath or shower) and (2) all units in dilapidated structures.

**Less than 0.5 percent.

Source: Table IV-1, Housing Statistics Handbook. August, 1966.

thousands of structures constructed in the next 22 years.[1] The demand for tenement housing came mainly from the swarms of immigrants who arrived during the last quarter of the century. Though many undesirable features of the old-law tenement were declared illegal for new housing in the Tenement House Act of 1901, multiple dwellings constructed after 1901 and before 1915 did not differ radically in plan, layout and design. The basic structural deficiencies listed below remain in all old-law and some new-law tenements:

a. Narrow air shafts, resulting in dark and poorly ventilated rooms.

b. Party or common walls, resulting in windowless rooms without ventilation.

c. Occupancy of 75 percent of the lot (70 percent in new-law) with consequent lack of open space and privacy, small yards and narrow courts.

d. Five-, six-, and seven-story walkups on narrow streets (in new-law tenements, height was limited to 1½ times the street width).

e. Non-fireproof construction (in old-law up to eight stories; in new-law up to six stories).

Masonry Structures Converted to Multi-Family Use

New York, in 1964, had 35,941 masonry structures, formerly one- and two-family houses, which housed 146,557 households.[2] The largest group in this class consists of brownstones built in the late 19th century, embodying many luxury features—high ceilings, tall windows, large rooms, 60 percent lot coverage. Conversion to multiple dwellings, however, was not always carefully planned or executed. Rehabilitation of these structures could yield better housing with more light and air, although with fewer units per building than either old-law or early new-law tenements.

Late New-Law and Post-1929 Multiple Dwellings

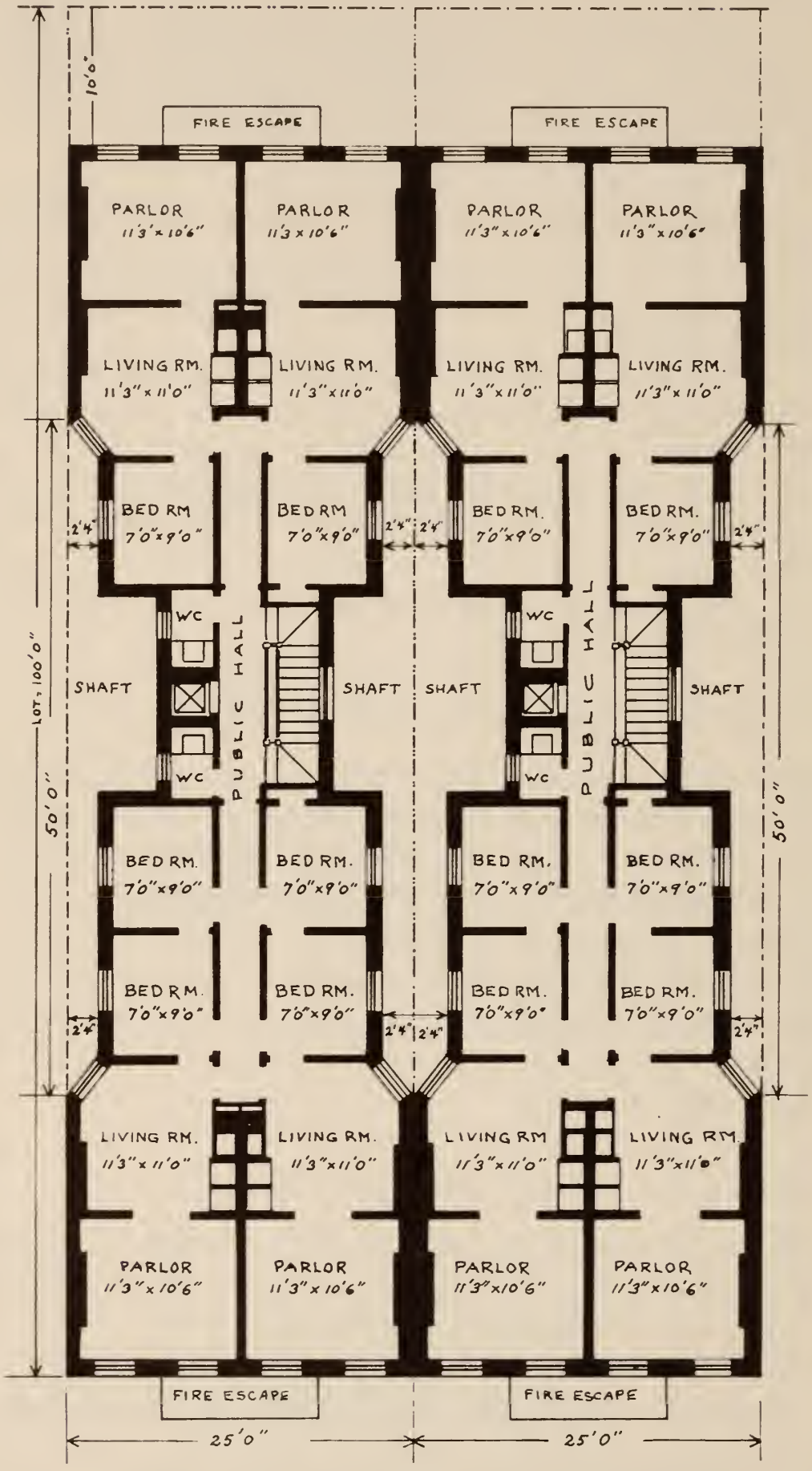
After World War I and prior to 1929, changes in regulations respecting design, layout, and lot coverage reduced densities and produced larger and better quality apartments.

The Multiple Dwelling Law affecting construction after 1929 had little impact until after World War II. Buildings constructed prior to

1. See Figures A-1 and A-2.
2. As of December 31, 1964—New York City Department of Buildings, *Annual Report*, 1964.

Figure A-1

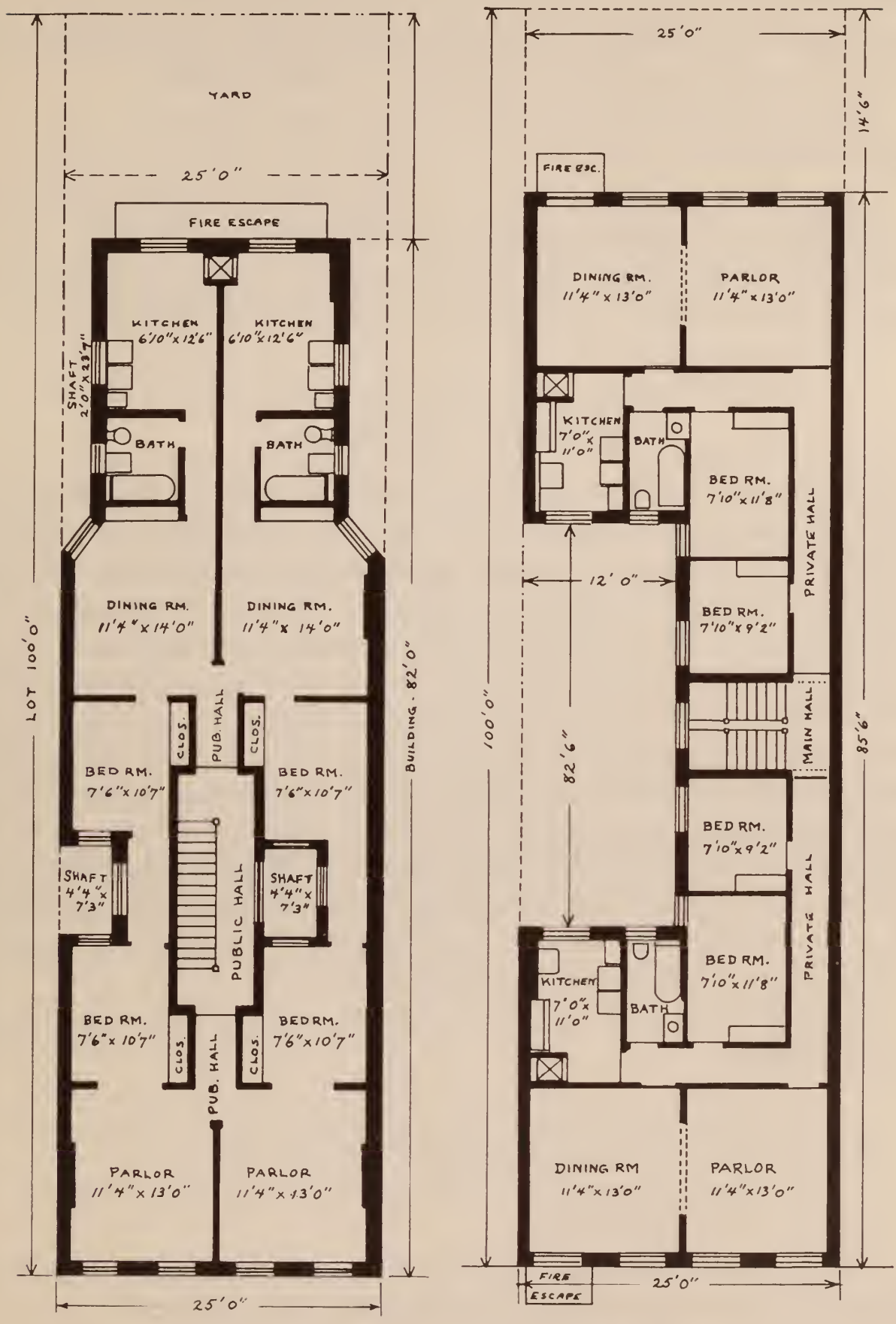
TWO "DUMBBELL" TENEMENTS
TYPES BUILT ON A 50-FOOT LOT UNDER THE OLD LAW



Source: First Report of the Tenement House Department of the City of New York 1902-1903

Figure A-2

TWO-FAMILY-ON-A-FLOOR FLATS UNDER THE OLD AND NEW LAW ON A 25-FOOT LOT



Old Law

New Law

Source: First Report of the Tenement House Department of the City of New York 1902-1903

World War II were not greatly different from late new-law structures in layout, apartment and room sizes, utilities, and open space. Most such buildings were high-rise elevator structures with large numbers of dwelling units. When apartment construction resumed in the late forties, more drastic changes occurred in layout, design, size of apartment, size and shape of structure, and variety of building types.

Frame Structures

Most frame structures cannot be considered as candidates for drastic rehabilitation. Those common in New York are primarily one- or two-family. Multi-family frame structures are deemed unsuitable for rehabilitation because of structural weakness of most of these types.

Location of Housing Most in Need of Rehabilitation or Replacement

The best source of data on the quantity, type, and conditions of the housing stock is the Community Renewal Program (CRP) field survey and studies, conducted under the aegis of the City Planning Commission in 1962. The CRP studies were based on special tabulations of 1960 Census data. In 1962, CRP personnel inspected areas with sizable concentrations of deteriorated housing as measured by a "census quality score." With supplemental information on interior and exterior conditions, 1,500 worst blocks in the city were identified. CRP later added 3,500 additional blocks to the initial 1,500 on the basis of field survey and Census data, thus raising the total number of blocks to 5,000. Structural condition for the added 3,500 blocks was judged solely by exterior observation. This deficiency, however, does not materially affect the usefulness of the data for estimating the number and location of most likely candidates for rehabilitation.

The following data, located by Census tract, were obtained from the CRP study.

1. Number of structures by type: frame, masonry, old-law and early new-law, and multiple dwellings built after 1929.
2. Structural condition: rated as good, fair, poor, and bad within each structural type.

Census tract data were combined by neighborhoods, as defined by community data books issued by the Board of Education.[1]

1. A summary of each neighborhood appears in the working documents on file at the Institute of Public Administration, along with lists of every Census tract in the city, its total housing stock (in units), the health areas in which each Census tract lies and the number of housing units covered by the CRP survey.

Identification of Most Likely Candidates for Rehabilitation or Replacement

The following criteria were used to identify most likely candidates for rehabilitation in the 5,000 worst blocks covered by the CRP survey:

1. For those structures in the 1,500 worst blocks, all masonry structures, old-law and early new-law tenements rated in the CRP survey as good, fair, and poor.

2. For those structures in the 3,500 blocks selected by exterior survey only, all masonry structures, old-law and early new-law tenements rated as fair and poor, except buildings deemed to have major structural weaknesses. (Structures rated "good" in this group were omitted, because without inspection of interiors there was no way of knowing whether they had already been renovated.)

The selection of candidates for rehabilitation is based on extensive architectural and engineering analysis of structural types and judgments of housing experts. This is not to say that rehabilitation is either desirable or economically feasible. Generally speaking, the same structures are also "most likely" candidates for replacement if new construction is the solution. To the list of candidates for replacement should be added buildings with major structural defects (not included with candidates for rehabilitation). Late new-law tenements and multiple dwellings are omitted, as buildings provided with elevators and other amenities ordinarily can be rehabilitated without gutting the entire structure.

Tables A-4 through A-7 summarize location of rehabilitation candidates in the blocks, by borough and neighborhood.

Table A-4

RESIDENTIAL STRUCTURES BY BOROUGH
NUMBER SURVEYED AND NUMBER OF REHAB CANDIDATES

	Total Structures[a]	Percent	Surveyed[b]		Rehab Candidates[c]			
			Number	Percent of Total Structures	Number	Percent of Total Structures	Masonry	Old-Law and Early New-Law
Bronx	73,821	100.0	15,882	21.5	5,496	7.4	1,421	4,075
Brooklyn	267,617	100.0	68,085	25.4	30,698	11.5	20,255	10,443
Manhattan	44,266	100.0	20,092	45.4	13,775	31.1	5,245	8,530
Queens	290,609	100.0	21,594	7.4	2,576	0.9	2,143	433
Richmond	49,560	100.0	6,610	13.4	381	0.8	344	37
New York City	725,873	100.0	132,263	18.2	52,926	7.3	29,408	23,518
			Distribution by Borough (Read Down)					
Bronx		10.2		12.0		10.4		
Brooklyn		36.9		51.5		58.0		
Manhattan		6.1		15.2		26.0		
Queens		40.0		16.3		4.9		
Richmond		6.8		5.0		0.7		
New York City		100.0		100.0		100.0		

a. Total structures by borough from Buildings Department 1962 Annual Report.
b. Surveys referred to are those conducted by Community Renewal Program in 1962.
c. Criteria for selection of rehab candidates described in text.

Table A – 5

HOUSING UNITS BY BOROUGH
NUMBER SURVEYED AND NUMBER OF UNITS IN REHAB CANDIDATES

	Total Housing Units [a]	Percent	Surveyed [b]		Rehab Candidates [c]			
			Number	Percent of Total Housing Units	Number	Percent of Total Housing Units	Masonry	Old-Law and Early New-Law
Bronx	475,961	100.0	124,684	26.2	52,961	11.1	2,521	50,440
Brooklyn	864,397	100.0	244,520	28.3	114,926	13.3	53,209	61,717
Manhattan	625,161	100.0	263,899	42.2	137,961	22.1	23,760	114,201
Queens	607,852	100.0	42,695	7.0	5,269	0.9	2,979	2,290
Richmond	63,756	100.0	10,719	16.8	735	1.2	625	110
New York City	2,637,127	100.0	686,517	26.0	311,852	11.8	83,094	228,758
			Distribution by Borough (Read Down)					
Bronx		18.0		18.2		17.0		
Brooklyn		32.8		35.6		36.8		
Manhattan		23.7		38.4		44.3		
Queens		23.1		6.2		1.7		
Richmond		2.4		1.6		0.2		
New York City		100.0		100.0		100.0		

a. Total units by borough from Buildings Department 1962 Annual Report. Does not include units in Class "B" structures. The number of such units is not reported by the Buildings Department.

b. Refers to survey conducted by the Community Renewal Program in the early part of 1963.

c. Criteria for selection of rehab candidates described in text.

Table A – 6

LOCATION OF REHAB CANDIDATES, STRUCTURES AND HOUSING UNITS[a]

Neighborhood	Structures		Units	
	Number	Percent of City Total	Number	Percent of City Total
Bronx	5,496	10.4	52,961	17.0
Morrisania	1,933	3.7	24,677	7.9
South Bronx	1,913	3.6	20,137	6.5
11 Other Neighborhoods	1,650	3.1	8,147	2.6
Brooklyn	30,698	58.0	114,926	36.9
Bedford-Stuyvesant	9,939	18.8	16,737	5.4
Park Slope	4,106	7.8	15,829	5.1
Crown Heights	2,828	5.3	7,583	2.4
Williamsburg	2,432	4.6	12,446	4.0
South Brooklyn-Red Hook	2,429	4.6	8,298	2.7
Brooklyn Heights-Fort Greene	1,578	3.0	6,692	2.1
Brownsville	1,479	2.8	6,276	2.0
Greenpoint	1,072	2.0	5,649	1.8
Coney Island	1,046	2.0	3,082	1.0
11 Other Neighborhoods	3,789	7.1	32,334	10.4
Manhattan	13,775	26.0	137,961	44.2
East Harlem	2,937	5.5	28,066	9.0
Lower East Side	2,499	4.7	22,611	7.3
Central Harlem North	2,267	4.3	18,534	5.9
Central Harlem South	2,039	3.9	24,142	7.7
11 Other Neighborhoods	4,033	7.6	44,608	14.3
Queens	2,576	4.9	5,269	1.7
Richmond	381	0.7	735	0.2
New York City Total	52,926	100.0	311,852	100.0

a. Selection of rehab candidates from CRP field survey data based on criteria described in text.

Table A – 7

LOCATION OF STRUCTURES SUITABLE FOR DEMOLITION BY TYPE[a]

Neighborhood	Total	Percent of Total Survey	Masonry	Old-Law and Early New-Law
Bronx	498	3.2	28	470
Morrisania	257		10	247
South Bronx	229		6	223
11 Other Neighborhoods	12		12	–
Brooklyn	2,643	3.9	1,700	943
Bedford-Stuyvesant	729		507	222
Park Slope	208		116	92
Crown Heights	40		35	5
Williamsburg	256		181	75
South Brooklyn-Red Hook	557		397	160
Brooklyn Heights-Fort Greene	125		114	11
Brownsville	60		17	43
Greenpoint	500		220	280
Coney Island	32		30	2
11 Other Neighborhoods	136		83	53
Manhattan	1,389	6.9	564	825
East Harlem	90		19	71
Lower East Side	258		62	196
Central Harlem North	179		75	104
Central Harlem South	45		11	34
11 Other Neighborhoods	817		397	420
Queens and Richmond	32	0.1	30	2
New York City Total	4,562	3.4	2,322	2,240

a. Structures classified as Condition 4 in Community Renewal Field Survey.

Characteristics of Tenants and Conditions of Tenancy

Who lives in the worst housing? Generally, we know the tenants are the poor, particularly the Negro and Puerto Rican immigrants. Yet neighborhoods differ with respect to population characteristics, and also with respect to patterns of change. The only available extensive data on tenants are those of the 1960 Census of Population. Since these are organized by Census tracts, rather than by Census blocks, it is not possible to isolate for analysis the population of the "worst blocks" covered by the CRP study. We have therefore analyzed the population of selected Census tracts which meet the following criteria:

1. At least 85 percent of the housing units in the tracts were renter-occupied at the time of the 1960 Census.
2. At least 85 percent of the housing units in the tracts were covered by CRP field surveys of the 5,000 worst blocks.
3. Most of the housing units in the tracts were candidates for rehabilitation or replacement, by criteria mentioned on page 77.

Forty-eight Census tracts were found which met these criteria. The following table shows their distribution by neighborhood, along with percentages of structures that seemed in need of replacement or rehabilitation.

Table A – 8

CENSUS TRACTS WITH HIGH CONCENTRATIONS OF BAD HOUSING

Neighborhood	Number of Census Tracts Selected	Total Housing Units	Proportion of Dwelling Units Needing Rehabilitation or Replacement
Morrisania	6	17,612	95.6
Brooklyn Heights-Fort Greene	3	6,062	81.1
Bedford-Stuyvesant	7	12,469	85.9
Lower East Side	4	12,347	95.4
Chelsea	4	12,155	89.7
Clinton	3	6,151	94.9
East Harlem	9	24,240	93.9
Central Harlem South	9	28,628	99.4
Central Harlem North	3	3,489	100.0
Total	48	123,153	93.9

Some of the major characteristics of tenants and tenancy which affect housing policy are summarized in the following table. Together they make up a profile of each neighborhood. The characteristics included are:

1. Proportions of Negroes and Puerto Ricans in the total population.
2. Income distribution.
3. Proportion of children and aged in the total population.
4. Distribution of household size.
5. Average rentals.
6. Average duration of tenancy.
7. Overcrowding of dwelling units.
8. One-room units, a measure of the rooming house problem.

Table A-9

CHARACTERISTICS OF PEOPLE WHO LIVE IN BAD HOUSING[a]

	Ethnic Minorities (Percentage of Total Population)		Income Distribution (Percentage of Total Population)			Old and Young (Percentage of Total Population)		Household Sizes (Percentage Distribution)					
	Negro	Puerto Rican	Under $3,000	$3,000-4,999	$5,000 & Over	Under 18 Years	65 & Over	1	2	3	4	5	6 or More
NEW YORK CITY	14	8	28	21	51	28	11	20	30	19	16	8	7
Morrisania	22	44	41	28	31	33	7	17	25	19	16	10	12
Brooklyn Heights-Fort Greene	27	24	47	26	27	27	9	40	27	15	9	5	5
Bedford-Stuyvesant	60	23	42	30	28	38	5	16	25	19	15	11	15
Lower East Side	3	16	47	25	28	23	15	6	29	15	11	6	4
East Harlem	36	36	49	28	23	35	7	24	24	18	15	9	12
Central Harlem S.	98	52	54	27	20	25	7	36	25	14	10	7	8
Central Harlem N.	99	.2	41	34	25	30	7	26	30	17	11	6	9

a. Based on sample census tracts with concentrations of deteriorating housing.

Table A – 9 (Continued)

CHARACTERISTICS OF TENANCY IN BAD HOUSING

	Gross Rental (Percentage Distribution)			Duration of Tenancy (Percentage of Tenants)		Overcrowding (Percentage of Housing Units)	One-Room Occupancy (Percentage of Tenants)
	Under $60	$60–99	$100 & Over	Less Than 2 Years	Over 20 Years	1.51 Persons or More Per Room	One Room
NEW YORK CITY	30	49	22	25	15	7	4
Morrisania	45	52	3	29	10	10	11
Brooklyn Heights - Fort Greene	35	56	9	43	10	39	20
Bedford-Stuyvesant	37	55	7	35	9	7	11
Lower East Side	75	21	44	27	19	6	5
East Harlem	65	30	44	24	14	16	13
Central Harlem S.	49	43	8	21	14	29	13
Central Harlem N.	53	40	7	16	21	99	9

Source: 1960 Census of Housing and Population.

Morrisania

This area has some of the most deteriorated housing stock in the city. There has been an increase since 1960 in both Negro and Puerto Rican population, with Puerto Rican predominating. The proportion of children and the size of households has reportedly grown, and overcrowding is increasing. Few houses have been boarded up or abandoned, however.

City regulatory agencies have begun a 50-block code enforcement drive, which may result in abandonment and boarding-up (as it did in East Harlem).

Brooklyn Heights-Fort Greene

Most of the housing stock suitable for rehabilitation consists of small masonry structures. Many in the western portion are already undergoing extensive privately financed renovation. The three Census tracts in the sample are in the southeastern corner of the neighborhood around the Fort Greene housing project. The population of this area is predominantly and increasingly Negro and Puerto Rican. In 1960 the turnover and single-room occupancy rates were the highest in any of the neighborhoods. Rents also were relatively high.

Bedford-Stuyvesant

Over 80 percent of the population in Bedford-Stuyvesant is Negro or Puerto Rican. Community leaders interviewed have the impression that the proportion of relatively stable families is fairly high. Many households who have moved in recently have come from adjacent Brownsville, which has more deteriorated housing, including many frame structures. Families tend to move out as their economic circumstances improve; some buy homes in Crown Heights and Flatbush. Bedford-Stuyvesant has many small masonry structures which might be rehabilitated. Since there is great demand, few vacancies, and relative stability, rehabilitated structures would doubtless find a good market. Such structures might also offer an opportunity for experiments with resident ownership, to further incentives for renovation and better maintenance. (A program of community involvement in planning housing improvement is just getting under way.)

Lower East Side

While considerable new housing, both public and limited profit, has been constructed in the southern and eastern sectors along the East River, the major part of this neighborhood consists of row upon row of old-law and early new-law tenements. Because it is one of the few remaining low-rent areas (in 1960, 75 percent of the tenants in the sample paid less than $60 per month), it has attracted students and other young newcomers to the city. It also has a core of one- and two-person older households which have remained in the area since immigration to the United States early in the 1900's. In 1960 Negro families constituted only 2.5 percent of the population. The Puerto Rican population has been steadily rising, particularly in the eastern and southern sectors, with families migrating from other neighborhoods. Occupied buildings and apartments are overcrowded, but there are many vacant buildings and dwelling units, particularly in areas east of Avenue B. In the western sector many structures are being renovated into efficiency apartments by private owners. Many vacant buildings have been boarded up and removed from the market, either by owners or because of action by various enforcement agencies (Buildings Department, Fire Department, or Health Department).

Harlem

"Harlem" has become synonymous with "ghetto." In the city's renewal program it is designated one of three areas which will require major action. Harlem's density has been among the highest in the nation. A recent survey of Harlem opinion[1] revealed that housing was considered the number one problem of the community and that resistance to demolition and relocation was relatively small.

East Harlem is being rapidly "decanted." Part of the decanting is due to concerted community pressure on the city administration, and ultimately on the landlords, for code enforcement. This has led to both compliance and abandonment. Community organizations have pressed for demolition of vacant structures and though the pace is slow, it has been increasing. New housing developments are being planned by the City Housing Authority on 101st and 102nd Streets, and a middle-income housing project (Benjamin Franklin Houses) was constructed several years ago on 105th Street. The major problem still remaining in East Harlem is a large stock of deteriorated housing, some

1. John F. Kraft, Inc., *A Survey of Attitudes of Harlem Residents Toward Housing, Rehabilitation, and Urban Renewal* (August 1966).

vacant, combined with a hard core of large families which still live under overcrowded conditions. The people of the area are primarily Negro and Puerto Rican, and old-law tenements predominate; farther west and north the population is almost solidly Negro, and there is a higher proportion of brownstones.

The population profiles for East Harlem, Central Harlem North, and Central Harlem South show both similarities and significant differences. The most stability (as of 1960) appears in Central Harlem North, where one out of five tenants in the tracts surveyed had lived in the same apartment for over 20 years, and only 16 percent moved into present quarters within the last two years. This is the most stable of any of the nine communities surveyed. However, it has been observed that:

> It is a bit of semantic irony that poor ghetto families are called 'stable' because they could not follow the route of upward mobile Jews, Italians, and Irish who have now become urbanized and moved into communities which enjoy good schools, clean, well maintained facilities including streets and parks, reasonable densities in what at least approaches a wholesome environment.[1]

This quotation points up the basic dilemma in advocating rehabilitation and replacement of Harlem housing, particularly rehabilitation which has as its expressed objective the return of present residents to the rehabilitated structures.

1. Clarence Funnyé, *Deghettoization*, Idea Plan Associates, Inc. (1965), p. 57.

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